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PISTON DISPLACEMENTS IN CUBIC INCHES AND RATED HORSE-POWER FOR 4-CYLINDER MOTORS

FOR 8-CYLINDER MOTORS, MULTIPLY GIVEN DISPLACEMENT BY 2

Cylinder Bore in Inches	STROKE IN INCHES																														SAE Rating HP
	3	3⅛	3¼	3⅜	3½	3⅝	3¾	3⅞	4	4⅛	4¼	4⅜	4½	4⅝	4¾	4⅞	5	5⅛	5¼	5⅜	5½	5⅝	5¾	5⅞	6	6¼	6½	6¾	7	7¼	7½	7¾	8	
2½	59	61	64	66	69	71	74	76	79	81	83	86	88	91	93	96	98	101	103	106	108	110	113	115	118	123	128	132	138	142	148	152	157	10 0
2⅝	65	68	70	73	76	79	81	84	87	89	92	95	97	100	102	106	108	111	114	116	119	122	124	127	130	135	140	146	152	157	162	168	173	11 05
2¾	71	74	77	80	83	86	89	92	95	98	101	104	107	110	113	116	119	122	125	128	131	134	137	140	143	148	154	160	166	172	178	184	190	12 1
2⅞	78	81	84	88	91	94	97	101	104	107	110	114	117	120	123	126	130	133	136	140	143	146	149	152	156	162	169	175	182	188	195	201	208	13 2
3	85	89	92	95	99	103	106	110	113	117	120	124	127	131	134	138	141	145	148	152	156	159	163	166	170	177	184	191	198	205	212	219	226	14 6
3⅛	92	96	100	104	107	111	115	119	123	127	130	134	138	142	146	150	153	157	161	165	169	173	176	180	184	192	199	207	214	222	230	238	245	15 6
3¼	100	104	108	112	116	120	124	129	133	137	141	145	149	153	158	162	166	170	174	178	183	187	191	195	199	207	216	224	232	240	249	257	265	16 9
3⅜	107	112	116	121	125	130	134	139	143	148	152	157	161	165	170	175	179	183	188	192	197	201	206	210	215	224	233	242	251	260	268	277	286	18 25
3½	115	120	125	130	135	140	144	149	154	159	164	168	173	178	183	188	192	197	202	207	212	217	221	226	231	241	250	260	269	279	289	298	308	19 6
3⅝	124	129	134	139	145	150	155	160	165	170	176	181	186	191	195	201	206	211	217	222	227	232	237	243	248	258	268	279	289	299	310	320	330	21 0
3¾	133	138	144	149	156	160	166	171	177	182	188	193	199	204	210	215	221	226	232	237	243	249	254	260	265	276	287	298	309	320	331	342	353	22 5
3⅞	142	147	153	159	165	171	177	183	189	195	200	206	212	218	224	229	236	242	248	253	260	265	271	277	283	295	307	318	330	342	354	366	377	24 0
4	151	157	163	170	176	182	189	195	201	207	214	220	226	233	239	245	251	258	264	270	277	283	289	295	302	314	327	339	352	364	377	390	402	25 6
4⅛	160	167	174	180	187	194	201	207	214	221	227	234	241	247	254	261	267	274	281	287	294	301	307	314	321	334	348	361	374	388	401	414	428	27 2
4¼	170	177	184	191	199	206	213	220	227	234	241	248	255	262	269	277	284	291	298	305	312	319	326	333	340	355	369	383	397	411	426	440	454	28 9
4⅜	180	188	195	203	211	218	226	233	241	248	256	233	271	278	286	293	301	308	316	323	331	338	346	353	361	376	391	406	421	436	451	466	481	30 6
4½	191	199	207	215	223	231	239	247	255	262	270	278	286	294	302	310	318	326	334	342	350	358	366	374	382	398	414	429	453	461	477	493	509	32 4
4⅝	202	210	218	227	235	244	252	260	269	277	286	294	302	311	319	328	336	344	353	361	370	378	386	395	403	420	437	454	470	487	504	521	538	34 2
4¾	213	222	230	239	248	257	266	275	284	292	301	310	319	328	337	346	354	363	372	381	390	399	408	416	425	443	461	478	496	514	532	549	567	36 1
4⅞	224	233	243	252	261	271	280	289	299	308	317	327	336	345	355	364	373	383	392	401	411	420	429	439	448	467	485	504	523	541	560	579	597	38 0
5	236	245	255	265	275	285	295	304	314	324	334	344	353	363	373	383	393	403	412	422	432	442	452	461	471	491	511	530	550	569	589	609	628	40 0
5⅛	248	258	268	279	289	299	309	320	330	340	351	361	371	382	392	402	413	423	433	444	454	464	475	485	495	516	536	557	578	598	619	640	660	42 0
5¼	260	271	281	292	303	314	325	336	346	357	368	379	390	400	411	422	433	444	455	465	476	487	498	509	520	541	563	584	606	628	649	671	693	44 1
5⅜	272	284	295	306	318	329	340	352	363	374	386	397	409	420	431	443	454	465	477	488	499	511	522	533	545	567	590	612	635	658	681	703	726	46 2
5½	285	297	309	321	333	345	356	368	380	393	404	416	428	440	451	463	475	487	499	511	523	535	546	558	570	594	618	641	665	689	713	736	760	48 4
5⅝	298	311	323	336	348	360	373	385	398	410	422	435	447	460	472	485	497	509	522	534	547	559	572	584	596	621	646	671	696	721	746	770	795	50 6
5¾	312	325	338	351	364	377	390	403	416	429	441	454	467	480	494	506	519	532	545	558	571	583	597	610	623	649	675	701	727	753	779	805	831	52 8
5⅞	325	339	352	366	380	393	407	420	434	448	461	474	488	502	515	529	540	556	569	583	596	610	623	637	651	678	705	732	759	786	813	840	867	55 1
6	339	354	368	382	396	410	424	438	452	467	481	495	509	523	537	551	566	580	594	608	622	636	650	664	679	707	735	763	792	820	848	876	905	57 6
6¼	368	384	399	414	430	445	460	476	491	506	522	537	552	568	583	598	614	629	644	660	675	690	706	721	736	767	798	828	859	890	920	951	982	62 5
6½	398	415	431	448	465	481	498	514	531	548	564	581	597	614	630	647	664	680	697	713	730	747	763	780	796	829	863	896	929	962	995	1029	1062	67 5
6⅜	429	447	465	483	501	519	537	555	573	590	608	626	644	662	680	698	716	734	752	769	787	805	823	841	859	895	930	966	1002	1038	1074	1109	1145	72 7
7	462	481	500	520	540	559	578	597	616	635	653	672	692	711	731	750	770	789	809	828	847	867	886	904	923	962	1001	1040	1079	1118	1156	1194	1232	78 4
7¼	495	516	537	558	579	599	620	640	661	681	702	723	743	768	785	806	827	848	868	889	910	930	950	970	991	1016	1067	1118	1159	1199	1240	1280	1321	84 1
7½	530	552	574	597	619	640	662	685	707	729	750	772	795	818	840	862	884	908	929	950	972	994	1017	1040	1060	1104	1153	1196	1240	1283	1326	1372	1418	89 9
7¾	566	590	613	636	660	683	707	730	754	778	801	825	849	873	897	920	943	968	990	1017	1039	1062	1084	1107	1132	1179	1224	1272	1320	1368	1414	1460	1506	96 1
Factor A	500	521	542	563	583	604	625	646	667	688	708	729	750	771	792	813	833	854	875	896	917	938	958	979	1 000	1 042	1 083	1 125	1 167	1 208	1 250	1 292	1 333	

NOTE —S A E Horse Power Rating is based on *1000 feet per second piston speed.*

To find equivalent horse-power at *1000 revolutions per minute*, multiply S A E Rating for Given Bore, by Factor "A" for Given Stroke

PISTON DISPLACEMENTS IN CUBIC INCHES AND RATED HORSE-POWER FOR 6-CYLINDER MOTORS

FOR 12-CYLINDER MOTORS, MULTIPLY GIVEN DISPLACEMENT BY 2

Cylinder Bore in Inches	STROKE IN INCHES																														S A E. Rating H. P.
	3	3 1/8	3 1/4	3 3/8	3 1/2	3 5/8	3 3/4	3 7/8	4	4 1/8	4 1/4	4 3/8	4 1/2	4 5/8	4 3/4	4 7/8	5	5 1/8	5 1/4	5 3/8	5 1/2	5 5/8	5 3/4	5 7/8	6	6 1/4	6 1/2	6 3/4	7	7 1/4	7 1/2	7 3/4	8	
2 1/4	88	92	96	99	103	107	110	114	118	122	125	129	133	136	140	144	147	151	155	158	162	166	169	173	177	184	191	199	206	214	221	228	235	15 0
2 3/8	97	102	106	110	114	118	122	126	130	134	138	142	146	150	154	158	162	166	171	175	159	183	187	191	195	203	211	219	227	235	244	251	260	16 54
2 1/2	107	111	116	120	125	129	134	138	143	147	152	156	160	165	169	174	178	183	187	192	196	201	205	209	214	223	232	241	249	258	267	276	285	18 14
2 7/8	117	122	127	131	136	141	146	151	156	161	166	170	175	180	185	190	195	200	205	209	214	219	224	229	234	243	253	263	273	283	293	302	312	19 82
3	127	132	138	143	148	154	159	164	170	175	180	186	191	196	201	207	212	217	223	228	233	239	244	249	254	265	276	286	297	308	318	329	340	21 6
3 1/8	138	144	150	156	161	167	173	178	184	190	196	201	207	213	219	224	230	236	242	247	253	258	265	270	276	288	299	311	322	334	345	356	368	23 45
3 1/4	149	155	162	168	174	180	186	193	199	205	212	218	224	230	236	243	249	255	261	268	274	280	286	292	299	311	324	336	348	360	373	385	398	25 35
3 3/8	161	168	174	181	188	194	201	208	215	221	228	235	242	248	255	262	268	275	282	289	295	302	309	315	322	336	349	362	376	389	403	416	430	27 3
3 1/2	173	180	188	195	202	209	216	224	231	238	245	253	260	267	274	281	289	296	303	310	317	325	332	339	346	361	375	390	404	418	433	447	461	29 4
3 5/8	186	194	201	209	216	224	232	240	247	255	263	271	278	286	294	302	309	317	325	333	340	348	356	364	371	387	402	418	433	449	465	480	495	31 5
3 3/4	199	207	215	224	232	240	248	256	265	273	282	290	298	307	315	323	331	340	348	356	365	373	381	389	398	414	431	447	464	480	496	513	530	33 7
3 7/8	212	221	230	239	248	257	266	274	283	292	301	310	318	327	336	345	354	363	371	380	389	398	407	416	425	442	460	478	495	514	531	549	567	36 0
4	226	236	245	264	264	274	283	292	302	311	320	329	339	349	358	368	377	386	396	405	415	424	434	443	452	471	490	509	528	546	565	585	604	38 4
4 1/8	241	251	261	271	281	291	301	311	321	331	341	351	361	371	381	391	401	411	421	431	441	451	461	471	481	501	521	541	561	581	601	621	641	40 9
4 1/4	255	266	276	287	298	308	319	330	341	351	362	372	383	394	404	415	426	436	447	458	468	479	490	500	511	532	553	575	596	617	638	659	680	43 4
4 3/8	271	282	293	305	316	327	338	350	361	372	383	395	406	417	428	440	451	462	474	485	496	507	519	530	541	564	586	609	631	653	677	700	722	45 9
4 1/2	286	298	310	322	334	346	358	370	382	394	406	418	429	441	453	465	477	489	501	513	525	537	549	561	573	596	620	644	668	692	716	740	764	48 6
4 5/8	302	315	328	340	353	365	378	391	403	416	428	441	454	466	479	491	504	517	529	542	554	567	580	592	605	630	655	680	706	730	756	781	806	51 3
4 3/4	319	332	346	359	372	386	399	412	425	439	452	465	479	492	505	518	532	545	558	572	585	598	611	625	638	665	691	718	744	770	798	825	851	54 2
4 7/8	336	350	364	378	392	406	420	434	448	462	476	490	504	518	532	546	560	574	588	602	616	630	644	658	672	700	728	756	784	812	840	868	896	57 0
5	353	368	383	398	412	427	442	457	471	486	501	515	530	545	560	574	589	604	619	633	648	663	677	692	707	736	765	795	825	854	884	913	942	60 0
5 1/8	371	387	402	418	433	449	464	489	495	511	526	542	557	573	588	603	619	634	650	665	681	696	712	727	743	774	805	836	866	897	928	959	990	63 1
5 1/4	390	406	422	439	455	471	487	504	520	536	552	568	585	601	617	633	649	666	682	698	714	731	747	763	779	812	844	877	909	941	975	1008	1040	66 2
5 3/8	409	426	443	459	476	494	510	527	545	562	579	596	613	630	647	664	681	698	715	732	749	766	783	800	817	851	885	919	953	987	1021	1056	1090	69 4
5 1/2	428	445	464	481	499	516	535	553	570	588	606	624	641	659	677	695	713	731	748	766	784	802	820	838	855	891	927	962	998	1033	1069	1105	1141	72 7
5 5/8	448	466	485	504	523	540	559	578	597	615	634	653	671	690	709	728	746	765	784	802	821	839	858	876	893	932	970	1007	1044	1082	1119	1156	1193	75 9
5 3/4	468	487	506	526	546	565	585	604	624	643	662	682	702	721	740	760	780	799	819	838	857	877	896	916	935	974	1013	1052	1092	1130	1170	1209	1248	79 4
5 7/8	488	509	529	550	570	590	610	631	651	671	692	712	732	753	773	794	814	835	855	875	896	916	936	957	977	1018	1059	1099	1140	1180	1211	1261	1302	82 8
6	509	530	552	573	595	615	636	658	679	700	722	743	764	785	806	828	849	870	891	912	934	955	976	998	1019	1060	1101	1142	1184	1226	1270	1314	1358	86 4
6 1/4	553	575	598	621	645	767	690	713	736	760	782	805	828	852	875	897	920	944	967	990	1014	1038	1060	1084	1106	1152	1199	1245	1292	1339	1384	1429	1474	93 8
6 1/2	598	623	647	672	697	722	747	772	796	821	846	871	896	921	946	971	996	1020	1044	1068	1093	1118	1143	1169	1195	1246	1296	1346	1395	1445	1495	1544	1594	101 4
6 3/4	644	670	696	724	750	777	804	831	858	885	911	938	965	992	1020	1047	1075	1101	1128	1155	1182	1209	1236	1263	1289	1342	1398	1452	1505	1558	1612	1666	1720	109 3
7	693	722	751	780	809	837	866	895	924	953	981	1011	1041	1070	1099	1128	1157	1286	1214	1243	1272	1301	1330	1359	1388	1446	1504	1562	1620	1678	1736	1794	1848	117 7
7 1/4	744	774	805	836	867	898	929	960	991	1022	1053	1084	1116	1147	1178	1209	1240	1271	1302	1333	1364	1395	1426	1457	1488	1550	1614	1676	1737	1799	1860	1921	1982	126.2
7 1/2	796	829	862	895	928	961	995	1028	1061	1094	1127	1160	1193	1227	1260	1293	1326	1359	1392	1425	1458	1491	1524	1557	1592	1658	1725	1791	1858	1925	1991	2058	2124	135 0
7 3/4	850	886	921	957	992	1027	1062	1098	1133	1169	1204	1240	1275	1311	1346	1382	1417	1453	1488	1524	1559	1595	1630	1665	1700	1771	1841	1912	1983	2054	2125	2196	2267	144 2
Factor A	500	521	542	563	583	604	625	646	667	688	708	729	750	771	792	813	833	854	875	896	917	938	958	979	1 00	1 042	1 083	1 125	1 167	1 208	1 250	1 292	1 333	

NOTE —S.A E Horse-power rating is based on *1000 feet per minute piston speed.*

To find equivalent horse-power in *1000 revolutions per minute*, multiply rating, for given bore, by factor "A" for given stroke.

NOTE: *Due to the fact that engineering endeavor and research in the automotive field is constantly bringing about improvement in shop practice, all methods of procedure, clearances, specifications and tables contained in this book are subject to change without notice.*

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Motor Tune-Up

If trouble is experienced in obtaining proper motor performance, follow the instructions given in this section closely.

The information contained in the notes is important and should be closely observed.

Tune-Up Operation

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: Chain adjustment operation is necessary for only those models that have manual timing chain adjustments. If timing chain is loose, proper results cannot be obtained when timing the motor.
3. Synchronize distributor points.
   Note: The above operation is necessary only on those models having distributors with two sets of breaker contacts.
4. Check the ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; also, check gas lines for loose fittings.
7. Check fan and generator belt; adjust if necessary.
8. Tighten water pump nut, this operation is only necessary when packing gland is leaking.
9. Adjust carburetor; clean if necessary.
   Note: All Duplex models of Schebler carburetors should be dismantled and cleaned every 15,000 miles of service. If this practice is not followed, plugging of the passage to the main jet may occur as the result of sediment around the base of the needle seat.
   See adjustment precautions under carburetor adjustment.
10. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Timing Precautions

The most critical points to watch in a motor tune-up for all Auburn models are the setting and synchronizing of the ignition timing and valve tappet adjustment.

In synchronizing the ignition, the work should be exact. If a contact point setting is given for a range say of from .018″ to .022″ the breaker contacts should be set exactly within this range and for best service should be adjusted to the high clearance. This will allow for considerable wear on the breaker arm friction block before the setting reaches the lower limit clearance. Also, when synchronizing the contact points each set of points should be checked from all four lobes of the cam and if a variation exists the error should be averaged and the points set accordingly.

It will be found that the ignition setting will vary slightly with different kinds of fuel. For example, the ignition timing when non-detonating fuels are used should be advanced slightly over the timing setting when white gasoline is used. These timing adjustments should be determined by road test.

Adjust the valve tappets with the motor running at idling speed, set the tappet clearance so that the feeler gauge will just pass through freely with motor hot. This method of adjusting tappets should be used on all motors where an accurate tappet adjustment is necessary. It eliminates any possibility of clearance errors due to inaccurately machined cam heels or errors in judgment on the part of the mechanic by not having the cam in the proper position for adjustment.

Sluggish Motor

Ignition Governor.—On models equipped with ignition spark governors, the governor should be inspected to see that the weights work freely and do not stick in the retarded position. Any tendency to sticking will cause sluggish motor action.

High Tension Cable.—Under the electrical strains developed by the high voltages in high speed, high compression motors, a considerable loss of the secondary current to the spark plugs is sometimes caused by leakage through the high tension wiring even though the insulation seems to be in good condition. Check closely for cracks in the insulation due to corona action and any tendency to softness or bloating of the rubber. This is important and the wiring should be changed if any trouble is experienced.

Muffler Collapse.—Sluggishness, poor mileage and heating on models not equipped with muffler by-pass are sometimes caused by the inner partition of the muffler collapsing due to backfiring of the motor.

Spark Plug Gap Setting.—In hilly localities, better motor performance can sometimes be obtained by setting the spark plug gaps at .022″. If this setting is used readjust the breaker points to approximately .003″ less than the spark plug setting.

Low Gasoline Mileage

Fuel Pump.—On models equipped with fuel pump check for porous diaphragm. A small hole will be found in the side of the body of the fuel pump just below the diaphragm. If the diaphragm should become porous or leaky the gasoline passes through the diaphragm and out to the ground through the hole in the fuel pump body. Correct with new diaphragm.

Heat Manifold Control.—On the late models check the heat manifold control (Fig. 1) to see that

it is properly adjusted and works freely. If it sticks, poor mileage and motor performance will be the result.

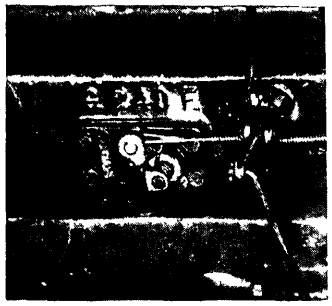


Fig 1

Showing heat manifold control in open position used on late Auburn cars. The control should be checked from time to time to see that it does not stick and works freely. If this valve sticks it will affect the efficient operation of the carburetor

Vacuum Booster.—On model 6-80 and 6-85 or cars equipped with vacuum booster, better mileage and motor performance can be obtained by replacing the vacuum booster with regular fitting Auburn part No. J-1-227 obtainable at any Auburn service station.

Carburetor Adjustment.—Poor gasoline mileage and motor performance may be the result of improper or faulty carburetor adjustment, especially on those cars equipped with Schebler carburetors. Before attempting a carburetor adjustment read the special precautions in carburetor adjustment section.

Motor Misfiring

Ignition Lock.—Motor missing or cutting out may be caused by a small metal chip getting into the armored housing of the Electro-lock close to the distributor assembly at the motor. This trouble is generally the result of rough handling of the distributor when removing it for repairs and appears when the car is in motion on the road. To check, grasp the cable housing with one hand and move it to different positions while the motor is idling on the service floor. If the motor cuts out or misses when the cable housing is disturbed, repair or replace with new cable.

Spark Plugs.—In cases of motor missing, spark plugs should be checked closely. Very often spark plugs will stand up under bench pressure tests but will break down in the motor due to cracks in the porcelain opening up under the influence of heat.

Motor Noise

Fuel Pump.—A noise similar to a loose valve tappet may be caused by a defective contact of the fuel pump actuating lever arm against the camshaft or a weak diaphragm spring. To correct if caused by pump lever arm, either dress with file or replace the arm ; if caused by weak spring, replace.

Oil Pump Check Valve.—A slight knock similar to a loose valve tappet may be caused by the oil pump check valve. To check, grasp the oil line to the oil gauge under the dash with the hand. This will deaden the noise if the trouble is in the check valve.

If replacing the check valve spring and plunger does not relieve the trouble, drill 3/32″ hole in plunger.

Muffler Noise.—Peculiar noises at high speeds may be due to resistance in the exhaust line caused by the collapsing of the inner lining of the muffler. This condition is generally the result of backfiring of the motor.

Valve Spring Whip.—A clattering noise at high motor speeds may be caused by what is known as valve spring whip. If the trouble is not caused by weak or defective springs, it can be corrected by inserting washers at the top of the spring.

Fan Belt Slipping.—A peculiar whistling noise may be caused by fan belt slipping at speeds from about 38 to 45 miles per hour (see motor vibration).

Manifold Warping.—On models 120 and 125 a hissing noise, similar to a blown exhaust gasket when the car is driven at from 45 to 50 miles per hour may be caused by the intake manifold warping and pulling away from the center bank of four cylinders. This condition is caused by the cold air from the radiator striking the hot exhaust manifold and only occurs when the car is traveling at high speed along the road and cannot be detected when the car is tested on the service floor.

To correct the trouble use two gaskets instead of one on the offending ports.

Motor Vibration

Fan Belt Slipping.—A very bad vibration of the motor at car speeds of from 38 to 45 miles per hour may be caused by slipping of the fan belt. The vibration is set up as the result of whipping of the loose belt.

OIL PRESSURE

Model and Year	Min	Max.
6-63-1925	5 lbs	40 lbs.
6-43-1925	5 lbs.	20 lbs
8-63-1925	5 lbs.	40 lbs
8-88-1925	10 lbs	30 lbs.
4-44-1926	10 lbs.	40 lbs.
6-66-1926	5 lbs	40 lbs
8-88-1926	10 lbs.	30 lbs.
6-66-1927	5 lbs	40 lbs
8-77-1927	5 lbs	40 lbs.
8-88-1927	10 lbs	30 lbs
6-76-1928	40 to 60 lbs	at 40 M P.H.
115-1928	25 lbs	at 35 M P H.
6-80-1929	30 to 60 lbs	at 40 M.P.H.
8-90-1929	25 lbs	at 30 M.P.H.
120-1929	25 lbs	at 30 M P.H.
125-1930	15 lbs	50 lbs
8-95-1930	15 lbs	40 lbs
6-85-1930	15 lbs	40 lbs

IGNITION TIMING

Models 6-63-1925, 6-43-1925, 8-63-1925, 8-88-1925-26-27, 4-44-1926, 6-66-1926-27, 8-77-1927.—The spark is timed to fire at top dead center of the compression stroke with the spark in fully retarded position.

On the earlier engines the opening in flywheel housing used for timing purposes is on the top face of the housing. On the later series, this hole is on the bottom front face of the flywheel housing. No. 1 dead center mark on the flywheel should be opposite the center line of the opening. In setting the flywheel, be sure that No. 1 cylinder is on the compression stroke. This can be determined by checking to see that both valves are closed on No. 1 cylinder.

If, for any reason, it should be found necessary to advance or retard the ignition on this setting, all that is necessary is to loosen the clamp screw on the advance arm and rotate the distributor in the desired direction

In no case should the ignition be advanced beyond a point where a spark knock is heard except under full load conditions.

On 8 cylinder models using an 8 lobe cam, two sets of contact points in series are used. Adjust one set of points to a clearance of .019″ and the other set to .022″. The ignition timing is set by the pair of points last to break.

Ignition Timing Table

The following table contains complete ignition timing specifications. See timing precautions under Motor Tune-Up above

Year	Model	Con Pt Clear	IGNITION TIMING			Spark Lever Position	Plug Gap	Firing Order
			Fly-Wheel Travel	Piston Travel	Dead Center Position			
1925	6-63	025″	T D C	T D C	T D C	Ret	030″	1-5-3-6-2-4
1925	6-43.....	025″	T D C	T D C	T D C	Ret	030″	1-5-3-6-2-4
1925	8-63	018″	T D C	T D C	T D C	Ret	024″	1-6-2-5-8-3-7-4
1925	8-88	*018″-022″	T D C	T D C	T D C	Ret	025″	1-6-2-5-8-3-7-4
1926	4-44	025″	T D C	T D C	T D C	Ret	030″	1-3-4-2
1926	6-66	025″	T D C	T D C	T D C	Ret	025″	1-5-3-6-2-4
1926	8-88	*018″-022″	T D C	T D C	T D C	Ret	025″	1-6-2-5-8-3-7-4
1927	6-66	018″-022″	T D C	T D C	T D C	Ret	025″	1-5-3-6-2-4
1927	8-77	*018″-022″	T D C	T D C	T D C	Ret	025″	1-6-2-5-8-3-7-4
1927	8-88	†.018″-022″	T D C	T D C	T D C	Ret	025″	1-6-2-5-8-3-7-4
1928	6-76	024″	T D C	T D C	T D C	Adv	025″	1-5-3-6-2-4
1928	8-88	†018″-022″	T D C	T D C	T D C	Ret	‡025″	1-6-2-5-8-3-7-4
1928	115	†018″-022″	6°	012″	B T C	Adv	‡025″	1-6-2-5-8-3-7-4
1929	6-80	018″-022″	10°		B T C	Adv	025″	1-5-3-6-2-4
1929	8-90	†018″-022″	6°	013″	B T C	Adv	‡025″	1-6-2-5-8-3-7-4
1929	120	†018″-022″	6°	013″	B T C	Adv	‡025″	1-6-2-5-8-3-7-4
1930	125	018″ 022″	7½°		B T C	Adv	‡030″	1-6-2-5-8-3-7-4
1930	8-95	018″ 022″	7½°		B T C	Adv	‡030″	1-6-2-5-8-3-7-4
1930	6-85	018″ 022″	5°		B T C	Adv	‡030″	1-5-3-6-2-4

B T C —Before top center T D C —Top dead center

*This type of distributor has two sets of contact points which are opened simultaneously by a hardened steel cam with 8 lobes

†This type of distributor uses a 4 lobe cam with two sets of contact points connected in parallel (See Ignition Timing—To synchronize breaker arm on 8 cylinder distributors with 4 lobe cam)

‡In some instances in hilly localities, better motor performance can be obtained by setting the spark plug gaps at 022″ If this setting is used, readjust the breaker points to approximately 003″ less than the spark plug setting

Model 6-76-1928.—To time the spark to the motor the flywheel must be set so that No. 1 cylinder is at T.D.C. on the firing stroke. The opening in flywheel housing used for timing purposes, is on the bottom front face of the housing. No. 1 dead center mark on the flywheel should be opposite the center line of this opening. With the spark lever in full advance position, the contact points should just begin to break.

A small amount of variation can be taken up by loosening the clamp on the advance arm and then turning the distributor head. If there is not enough clearance between the cables and the cable-tubes, it will be necessary to remove the distributor and readjust the driving coupling on the end of the shaft.

To advance or retard the spark rotate the distributor in the desired direction.

The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Model 6-80-1929.—To time the spark to the motor, the flywheel must be set so No. 1 cylinder is 10° ahead of top dead center on firing stroke; that is, turn crank clockwise until mark on flywheel lacks 3 teeth of reaching top center position. In this position the spark lever on the steering column should be set at full advance. The distributor should then be set so that the contact points are just breaking for No. 1 cylinder. A small amount of variation can be taken up by loosening the clamp on advance arm and then turning distributor ahead. If there is not enough clearance between the cables and cable-tubes, it will be necessary to remove the distributor and readjust the driving coupling on the end of the shaft.

To advance or retard the ignition rotate the distributor housing in the desired direction.

The ignition should not be advanced beyond a point where a spark knock is heard except under full load conditions.

The opening in flywheel housing used for timing purposes is on bottom front face of housing. No. 1 dead center mark on flywheel should be opposite center line of this opening.

Models 115-1928, 8-90 and 120-1929.—To time the spark to the motor, the flywheel must be set so No. 1 cylinder is 6° ahead of top dead center on the firing stroke; that is, turn crank clockwise until mark on flywheel lacks two teeth of reaching top center position. In this position, the spark lever on steering column should be set at full advance. The distributor should then be set so the contact points are just breaking for No. 1 cylinder. A small amount of variation can be taken up by loosening the clamp on advance arm and then turning distributor ahead. If not enough clearance between cables and cable-tubes, remove the distributor and readjust the driving coupling on the end of shaft.

To advance or retard the ignition rotate the distributor in the desired direction.

The ignition should not be advanced beyond a point where a spark knock occurs except under full load condition.

The opening in flywheel housing used for timing purposes, is on bottom front face of housing. No. 1 dead center mark on flywheel should be opposite the center line of this opening.

Auburn Model 125 and 8-95 1930.—Crank the motor until No. 1 piston is entering compression stroke. Continue cranking until the flywheel is 7½° or approximately 2½ ring gear teeth before top center. At this point the breaker contacts should just start to open with spark lever fully advanced.

If it should be desired to set ignition timing by top dead center marks the contact points should just start to open with advance lever in one-half advance position on the quadrant with No. 1 piston at top dead center. Final check and adjustment should be made by road testing the car. See table for contact point setting.

On 8 cylinder models using an 8 lobe cam, two sets of contact points in series are used. Adjust one set of points to a clearance of .019″ and the other set to .022″. The ignition should be set by the last pair of points to break.

Auburn Model 6-85 1930.—Crank the motor until the piston in No. 1 cylinder is entering compression stroke; continue cranking until the flywheel is 5° or approximately 1.3 ring gear teeth before top dead center. At this point the breaker contacts should just start to open with spark lever fully advanced.

If it should be desired to set ignition timing by top dead center marks the contact points should just start to open with advance lever in one-half advance position on the quadrant with No. 1 piston at top dead center. Final check and adjustment should be made by road testing the car. See table for contact point setting.

To synchronize breaker arm on 8 cylinder distributors with 4 lobe cam.—One set of contact points is stationary and the other set is movable. The stationary set is adjusted first and synchronizing is completed by adjustment to the movable set of points. To set contact opening of arm (A), Fig. 2, turn distributor shaft in its direction of rotation which is clockwise viewed from top until rubbing block of breaker arm (A), is on lobe of cam. Loosen screw (B), and turn screw (C) to get contact opening which should be from .018″ to .024″ and preferably .022″. Tighten screw (B).

Again turn the shaft until rubbing block of breaker arm (D), is on lobe of cam. Loosen screw (E), turn screw (F) until points open between .018″ and .024″ and preferably .022″. Tighten screw (E).

Put synchronizing tool over cam, locking it with the slide pushed through showing the arrow that points in the direction the shaft rotates as viewed from top.

Turn shaft clockwise (looking from top) until breaker arm (A) breaks contact. Note marking on (M) side of synchronizing tool that is in line with point (X) which is the edge of slot in distributor base rim. Continue to turn shaft until the same

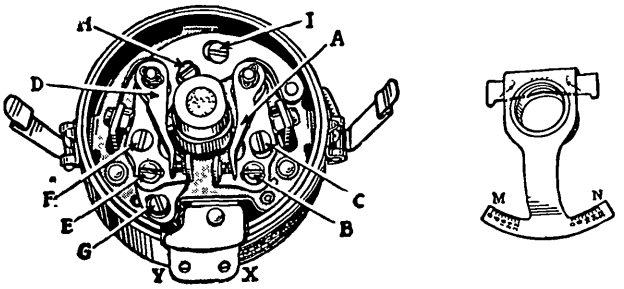


Fig 2

Two types of 8 cylinder distributors were used on Auburn cars. The first type has an 8 lobe cam with two sets of contact points in series opening simultaneously. The second or latest type (Fig 2) uses a 4 lobe cam with two sets of contact points in parallel.

marking on (N) side of tool is in line with point (X). Loosen screws (G) and (H) and turn screw (I) until arm (D) breaks contact. Check this by rotating shaft again. Tighten screws (G) and (H). Also check contact opening of breaker arm (D), and if it was set before at .022″, it should still be within the limits. If outside of these limits, reset the point opening and synchronize arms again. Do not make any adjustments to arm (A), but confine the adjustments to arm (D) to complete the synchronizing.

The graduations on the tool represent engine degrees and the breaker arm must not be out of synchronism more than two engine degrees.

The eye cannot detect the moment the points open, and to get an accurate synchronizing adjustment, an ammeter should be connected in the ignition circuit at the distributor terminal. If on the car, make sure ignition switch is "on." The instant the ammeter needle drops back to zero, the points open.

VALVE TIMING

Model 663-1925.—Set the exhaust valve tappet clearance for No. 1 cylinder at .006″. Crank the engine until the exhaust valve just closes. At this point the flywheel mark "I-O-E-C-1-6" should be under the indicator at the top of the flywheel housing.

Model 6-43-1925.—Set the exhaust valve tappet clearance for No. 1 cylinder at .007″. Crank the engine until the exhaust valve just closes. At this point, the flywheel mark "T.D.C." should be ⅛″ past the indicator mark at the top of the flywheel housing.

Model 8-63-1925, 8-77-1927, 8-88-1925-26-27-28, 6-76-1928.—Set the intake valve tappet clearance for No. 1 cylinder at .010″. Crank the engine until the intake valve just starts to open. At this point, the flywheel mark "T-C 1&8" should be under the indicator in the peek hole in the flywheel housing.

Note: This clearance should be reset after timing operation is complete. (See table for VALVE CLEARANCE.)

Valve Timing Table

The following table contains complete valve timing specifications Valve tappet adjustments for all late models are critical and should be made with engine idling See timing precautions above

Year	Model	Tappet Adjustment				Valve Timing			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh				
1925	6-63	006″	006″	004″H	006″H	63/64″ A		Opens	Closes
1925	6-43		007″	004″H	006″H	1/8″A			Closes
1925	8-63	010″		006″H	008″H	D C		Opens	
1925	8-88	010″		006″H	008″H	D C		Opens	
1926	4-44	008″		004″H	006″H	D C		Opens	
1926	6-66	010″		006″H	008″H	D C		Opens	
1926	8-88	010″		006″H	008″H	D C		Opens	
1927	6-66 Lyc	010″		006″H	008″H	D C		Opens	
1927	6-66 Cont		007″	004″H	006″H	1° A			Closes
1927	8-77	010″		006″H	008″H	D C		Opens	
1927	8-88	010″		006″H	008″H	D C		Opens	
1928	6-76	010″		006″H	008″H	D C		Opens	
1928	8-88	010″		006″H	006″H	D C		Opens	
1928	115	010″		006″H	006″H	D C		Opens	
1929	6-80	010′		006″H	006″H	D C		Opens	
1929	8-90	010″		006″H	006″H	D C		Opens	
1929	120	010″		006″H	006″H	D C		Opens	
1930	125	010″		006″H	008″H	*5°B		Opens	
1930	8-95	010″		006″H	008″H	*5°B		Opens	
1930	6-85	010″		006″H	008″H	*5°B		Opens	

A —After top center B —Before top center D C —Top dead center
H —Hot setting If no symbol is given set tappets cold
*5° of flywheel travel is approximately 1 68 ring gear teeth on Model 125 and 1 30 ring gear teeth on Models 8-95 and 6-85

Model 6-66.—(Continental motor).—Set the take valve tappet clearance for No. 1 cylinder at .010″. Crank the engine until the intake valve just starts to open. At this point the flywheel mark "T.C.-1&6" should be under the indicator at the top of the flywheel housing.

Note: The valve tappet clearance should be reset after the timing operation is complete. (See table for VALVE CLEARANCE)

Model 6-66.—(Lycoming motor).—Set the in-exhaust valve tappet clearance for No. 1 cylinder at .007″. Crank the engine until the exhaust valve just closes. At this point, the flywheel mark "1-EX-C" should be under the indicator at the top of the flywheel housing.

Model 4-44-1926.—Set the intake valve tappet clearance for No. 1 cylinder at .008″. Crank the engine until the intake valve just starts to open. At this point, the pistons for No. 1 cylinder should be at T.D.C.

Note: The valve tappet clearance should be reset, after the timing operation is complete (see table VALVE CLEARANCE).

Models 115 1928, 8-90 1929, 120 1929.—Set the intake valve tappet clearance for No. 1 cylinder at .010″. Crank the motor until No. 1 piston is at T.D.C as indicated either by flywheel or piston travel. With the piston in this position, the intake valve for No. 1 cylinder should just start to open.

After the timing operation is complete, reset the valve tappets to the proper running clearance. See table for Timing Clearances.

Model 6-80 1929.—Set the intake valve tappet clearance for No. 1 cylinder to .010″. Crank the motor until the piston in No. 1 cylinder is at T.D.C. flywheel travel. At this position, the intake valve should just begin to open.

After the timing operation is complete, the valve tappets should be reset to the correct running clearance. See timing information in timing table.

Auburn Models 125, 8-95 and 6-85 1930.—Set intake valve for No. 1 cylinder to .010″ clearance. Crank motor until piston in No. 1 cylinder is at top dead center exhaust stroke. At this point the intake valve should just start to open The keyway in the front end of the crankshaft, where starting crank engages, will be on top of shaft and straight up and down when No. 1 piston is at top dead center.

CHAIN ADJUSTMENT

Model 6-43-1925, 6-66-1926-27, 115-1928, 120-1929, 125-1930.—Chain sag is adjusted by manual take-up. To tighten the chain, loosen the generator bolts slightly and swing the generator away from the engine until the chain begins to hum, then loosen just enough to stop the hum.

GAS LINE SCREENS

All models of Auburn equipped with vacuum tank feed have two strainer screens in the gas line; one is located in the head of the vacuum tank as shown at (A, Fig 3) and the other is located at the carburetor.

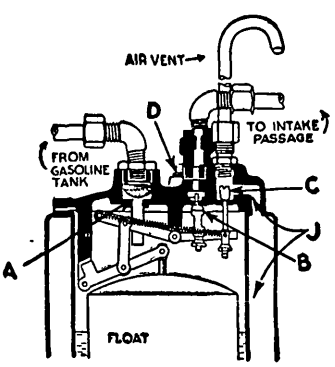


Fig 3

Upper half of vacuum tank showing position of gas line screen To remove disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

To clean the gas line screen (A, Fig. 3) at the vacuum tank, disconnect the gas lines from the gasoline supply tank and remove the elbow and bushings together with the gasoline strainers. Clean with air and gasoline.

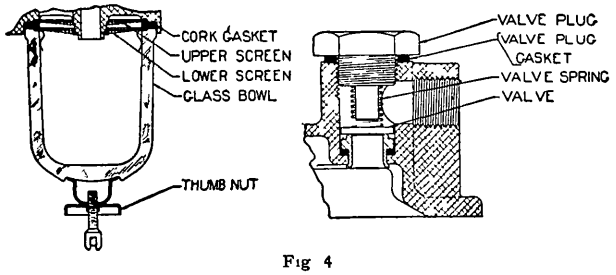


Fig 4

Cross section view of fuel pump glass bowl and pump valve Note the two strainer screens and position of cork gasket at the top of the glass bowl

The valve disc is held in position by a spring which in turn is held in place by the valve plug If valve plug is removed see that valve plug gasket is in good condition when plug is replaced

All models equipped with fuel pump feed have strainer screens in the top of the gasoline bowl at the fuel pump (Fig 4) and at the carburetor

To clean the fuel pump screens, remove the glass bowl and clean the screen assembly Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position If the gasket is damaged, replace with a new one

On Schebler Model S carburetor, having a brass bowl, the strainer screen can be removed for cleaning by first disconnecting the gasoline line and unscrewing the hexagon nut screw (B, Fig. 5). Remove the gauze and clean thoroughly by washing in gasoline and blowing through it with compressed air Clean the inside of the strainer body thoroughly and reassemble, making sure the gaskets are in place, and that the hexagon nut and gasoline line are properly tightened and do not leak

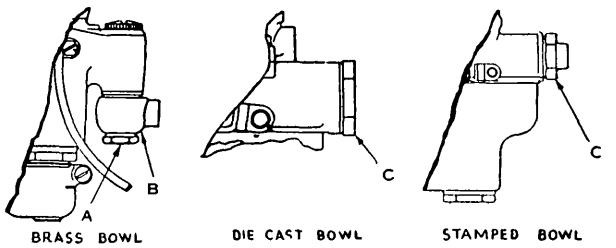


Fig 5

Showing gasoline connection for three types of Schebler Model S carburetors

To remove the strainer screen on Schebler carburetors equipped with die cast or stamped bowl, disconnect the gas line and remove the hexagon bushing (C, Fig 5)

FUEL PUMP

Repairs Made Without Dismantling Pump.—In the event of no fuel in the carburetor, the system should be checked for leaks or split seams in the gas line, or the gas line becoming kinked or flattened by the automobile body resting upon it Occasionally, due to the fact that the gasoline line extends to the bottom of the gas tank, a little sediment is drawn from the bottom of the tank, blocking off the flow of fuel

Other troubles which may be corrected without disturbing the fuel pump installation are Loose pipe fittings at the gasoline tank and the pump

Loose glass bowl, which should be tightened by the retaining nut, making sure that the cork gasket lies flat on its seat and is not broken

Dirty Screen.—To correct this trouble remove the glass bowl and clean the screen assembly Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position If the gasket is damaged replace with a new one

Loose Valve Plugs.—Tighten the valve plugs securely If necessary replace the valve plug gaskets

Leaks at the Diaphragm.—Tighten the cover screws evenly and securely Shellac should be applied to the edge of the diaphragm, either under the diaphragm on the surface which comes in contact with the fuel pump body or on the outside of the body at the point where the diaphragm protrudes Sometimes there appears to be a leak at the diaphragm, whereas the leak actually exists at the pipe fitting and has run down the pump body to the diaphragm flange, appearing to originate there

Carbureter Specifications

FLOAT LEVEL

Schebler Carburetors

In making repairs to a Schebler carburetor, it is very important when reassembling to be sure that you have the proper float level Holding the float, which is assembled to the float lever, you can easily bend it up or down in order to set the float at the proper distance to obtain correct float level The float lever measurement should be taken at the point between the top of the float and the carburetor body as shown in Fig 5A

Model S-1½", Die Cast.—Adjust the float ⅛" to 5/32" measuring between the float and carburetor body when float valve is seated

Model S-1¼", Duplex.—Float level 25/64" to 27/64" measuring between the float and carburetor body when the float valve is seated

Model S-1", Stamped Bowl.—Float level ⅛" to 5/32" measuring between the float and carburetor body when float valve is seated

Model S-1"-1¼"-1½", Brass Bowl.—Float level with float in bowl, 5/32" from top of bowl casting to top of float when float valve is seated

Model U-1" and 1¼"—When repairing a Schebler model U carburetor a correct float level adjustment can be obtained by bending the float lever up or down

With the float assembly in lower half of body, hold body up-side-down with float lever resting on float valve so that it is seated Measure from flange on lower half of body to top of float This should measure 2" on the 1" carburetor and 1 15/16" on

the 1¼" carburetor Be sure to remove the bowl gasket before taking this measure

On all new Model U Schebler carburetors, used on Auburn, set the float level so that the float lever arm is parallel with the flange of the carburetor body when needle valve is in the closed position

Stromberg Carburetors

Model 002.—The float valve controls the fuel level in the customary way, the carburetor being designed to operate under a standing level of 1" below the machined top of the float chamber

On most of the model 0 series carburetor, there is a float chamber plug in the side of the float chamber, when this is removed, the fuel should stand exactly even with the bottom of the hole when engine is not running

When the engine begins to draw fuel from the float chamber, the level goes down slightly, about 3/32"

The float level may be adjusted by screwing float needle valve up or down in the sleeve which engages the float levers, screwing the needle down will lower the level and also decrease the amount that the float needle can raise before the float strikes on its bottom, while screwing the needle upward in the sleeve will raise the level and give the float needle more travel

It is usually the case that with the level properly adjusted, the float needle will have a motion up and down of 3/64"

Model R-1.—The proper float level with engine not running is one inch from the top surface of float chamber Should the level be more than 1/16" higher or lower the float needle should be readjusted Remove valve cap (Fig 16) and upper end of float needle stem will be seen If level is too high, loosen lock nut, hold needle sleeve from turning by putting small wrench on flat sides and screw needle down, clockwise, one turn, which should lower level about three thirty-seconds of an inch, if too low, a full turn of needle upward will raise level same distance

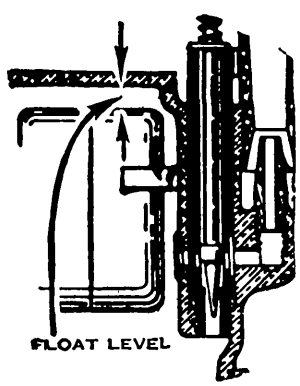


Fig 5A

Showing point at which float level should be measured on Schebler Model S carburetors The quickest method for checking the float level of Schebler carburetors is to see that the float lever arm stands parallel with the milled flange of the carburetor body

CARBURETOR SPECIFICATION DIAGNOSIS

Schebler Carburetor Specifications include only those parts that are most likely to be at fault if a correct carburetor adjustment cannot be obtained

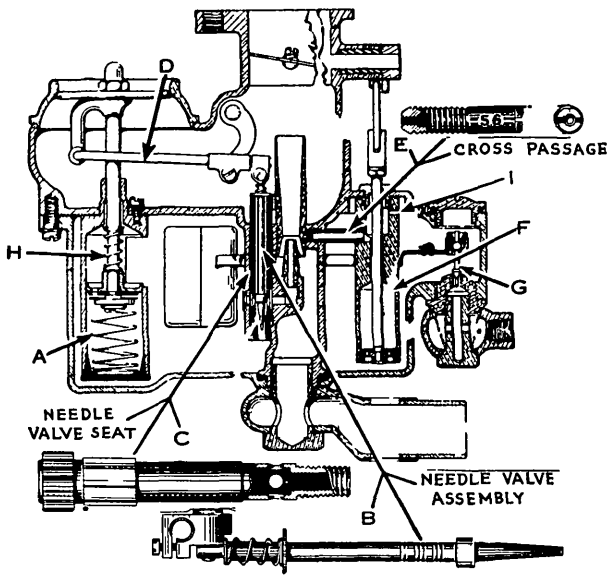


Fig 6

Cross section of Schebler Model S carburetor showing (A) lower air valve spring (B) needle valve assembly The size number of the needle valve is indicated by the number of rings machined on the body of the needle as shown (C) needle valve seat Due to the slight amount of wear on this part it rarely needs changing (D) needle valve lift lever (E) metering or cross passage The size of this part is stamped on the side of the body as shown (F) accelerating pump assembly (G) float needle valve assembly (H) upper air valve spring

Schebler "S" Carburetors

Each set of Schebler specifications is given for a given size motor To determine the specifications for any particular model of Auburn, first find the size of the motor in the table of Motor Specifications in the carburetor adjustment section and then refer to the Carburetor Specifications listed below for that size motor

Engine Size 3⅛"x 4¼"

DESCRIPTION OF PART	Part No or Size
Air Valve Spring—(A, Fig 6)	48 U
Needle Valve complete—(B, Fig 6)	No 1
Accelerating Pump Cross Passage—(E Fig 6)	No 54
Accelerating Pump Cylinder—(F, Fig 6)	No 36

Engine Size 3⅛"x 4½"

DESCRIPTION OF PART	Part No or Size
Air Valve Spring—(A, Fig 6)	48 U
Needle Valve complete—(B, Fig 6)	No 5
Accelerating Pump Cross Passage—(E, Fig 6)	No 54
Accelerating Pump Cylinder—(F, Fig 6)	No 36

Engine Size 2¾"x 4¾"

DESCRIPTION OF PART	Part No or Size
Air Valve Spring—(A, Fig 6)	48 U
Needle Valve complete—(B, Fig 6)	No 5
Accelerating Pump Cross Passage—(E, Fig 6)	No 52
Accelerating Pump Cylinder—(F, Fig 6)	No 36

Engine Size 3¼"x 4½"

DESCRIPTION OF PART	Part No or Size
Air Valve Spring—(A Fig 6)	48 U
Needle Valve complete—(B, Fig 6)	No 5
Accelerating Pump Cross Passage—(E, Fig 6)	No 54
Accelerating Pump Cylinder—(F, Fig 6)	No 36

Engine Size 2⅞"x 4¾"

DESCRIPTION OF PART	Part No. or Size
Air Valve Spring—(A, Fig. 6)	48 U
Needle Valve complete—(B, Fig. 6)	No. 1
Accelerating Pump Cross Passage—(E, Fig. 6)	No.54
Accelerating Pump Cylinder—(F, Fig. 6)	No.36

Stromberg Carburetors

Stromberg Carburetor Specifications are given for each model of carburetor. To determine the specifications for any particular model of Auburn equipped with Stromberg, first find the model of carburetor in the table of Motor Specifications in the Carburetor Adjustment section and then refer to the specifications below for that model of Stromberg carburetor.

Model 00-2.—The following table contains specification data for Stromberg Model 00-2 carburetors used on late model Auburn cars.

OO-2 MODEL	OO-2
NAME	1¼"
*Large Venturi	31/32"
*Main Discharge Jet	A-28 B-20
*Well Bleeder	43 Fixed
*High Speed Bleeder	70
*Accelerating Nozzle	53
*Gasoline Reducer	54
*Idling Discharge Holes	2-56 lower, 1-56 top
*High Speed Needle Seat	40
*Float Needle Seat	.140"
Small Venturi Tube	15/32"
Idle Needle Seat	56
Idle Tube Feed Hole	72
Idle Tube Bleeder Holes	2-58
*Idle Air Reducer	60
*Thermostat Reducer	45
Main Dis. Jet (Hole in Neck)	1-60
Main Dis. Jet (Side Holes)	2-60, 1 wall
Main Dis. Jet (Bottom Hole)	1-60
Outside Diameter Air Horn	2-19/32"
Inside Diameter Air Horn	2⅜"
Flange Centers	3 1/16"x1 47/64"
Flange Drill	11/32"

*Variable Specification.

Model R.—The following table contains carburetor specification data for Stromberg Model R carburetors used on the early models of Auburn.

MODEL R	R-1
NAME	1"
*Large Venturi	⅞"
*Main Discharge Jet	30–20
*Accelerating Well Bleeder	65
*High Speed Bleeder	70
*Idling Discharge Jet	56–66
*H. S. Needle Seat	53
*Float Needle Seat	.113"
Small Venturi	7/16"
Idle Tube Bleed Holes	2–65
Idle Tube Nozzle	65
Main Dis. Jet (Holes in Tip)	4–54
Main Dis. Jet (Holes in Neck)	2–55
Main Dis. Jet (Holes in Side)	64–60–58
Main Dis. Jet (Filler Holes)	6–54
Main Dis. Jet (Idle Feed Holes)	4–60
Flex. Tube (Fits Inside Horn)	1½"
Flex. Tube (Fits Outside Horn)	1¾"
Flange Centers	2⅜"
Size Drill	11/32"

*Variable Specification.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and year	Model	Engine make and model	No.	Bore and stroke	Carb. model and size
AUBURN					SCHEBLER
1924–25	8–63	Lyc	8	3⅛"x4¼"	S-1¼"
1925–26	8–88	Lyc	8	3⅛"x4½"	S-1¼"
1925	6–66	Lyc	6	3⅛"x4½"	S-1"
1925–27	6–66	Lyc	6	3⅛"x4½"	S-1"
1926	8–88	Lyc	8	3⅛"x4¼"	S-1¼"
1927–88	8–77	Lyc. GT	8	2¾"x4¾"	S-1¼"
1927–28	8–88	Lyc. 4 HM	8	3⅛"x4½"	S-1½"
1927–28	6–66	Cont. 7 R	6	2⅞"x4¾"	S-1"
1928	6–66	Lyc	6	3⅛"x4½"	S-1¼"
1928	8–88	Lyc	8	2⅞"x4¾"	S-1¼" Dplx.
1928	115	Lyc	8	3⅛"x4½"	S-1¼" Dplx.
1928	88	Lyc. GS	8	2⅞"x4¾"	S-1¼" Dplx.
1928	6–66	Lyc	6	3⅛"x4½"	S-1¼"
1928	115	Lyc. 4 MD	8	3⅛"x4½"	S-1¼" Dplx.
1929	6–80	Lyc. WS	6	2⅞"x4¾"	S-Ux 24-1¼"
1929	8–90	Lyc. GS	8	2⅞"x4¾"	S-1¼" Dplx.
1929	120	Lyc. MD	8	3⅛"x4½"	S-1¼" Dplx.
1930	125	Lyc. MDA	8	2⅞ x4¾	UX-51 1½
1930	8–95	Lyc. GR	6	2⅞ x4¾	UX-24 1¼
1930	6–85	Lyc. WR	8	3¼ x4½	S-1¼
					STROMBERG
1924–25	6–43	Cont. 7-U	6	3⅛"x4¼"	R-1
1928	8–88	Lyc. GS	8	2¾"x4¾"	00-2
1928	115	Lyc. MD	8	3¼"x4½"	00-2

ADJUSTMENT PRECAUTIONS

The adjustment information for carburetors used on Auburn automobiles from 1925 to 1930 inclusive is given by carburetor model rather than by car model. If it is desired to know what make and model of carburetor was used on any particular car model, refer to the motor specification table above.

On the late model cars gasoline mileage and engine performance are dependent more than ever before upon a correct carburetor adjustment; therefore, it is suggested that the information found under adjustment precautions be closely observed.

Manifold Effect on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making a range adjustment on Schebler Model U carburetors. Take for example, an adjustment from a rich to a lean mixture; the tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment can not be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. This is espe-

cially true of the idle and range adjustments and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the point where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Effect of Leaky Bowl on Adjustment.—On all Model U Schebler carburetors, a correct adjustment cannot be obtained unless the gasoline bowl is absolutely tight against the body flange. If the bowl has been removed for any reason, a new bowl gasket should be used and checked for leaks.

Idle Adjustment on Early Models 8-88 and 115.—On some of the early model 8-88 and 115 cars equipped with Schebler Model S carburetors, no stop was provided on the idle adjustment so that caution should be exercised not to screw the adjustment out of gear. By turning the idle adjustment screw more than 30 or 40 notches either to the right or left, there is danger that the vertical gear will drop away from the adjusting screw gear which would necessitate dismantling the carburetor.

This trouble can be checked by depressing the air valve and holding a small light in such a position that the gears can be seen through the air valve opening while turning the adjusting screw either to the right or the left.

Air Valve Flutter.—Fluttering of the air valve may be caused by a weak air valve or dash pot spring (A Fig. 6). A weakened spring will also make a correct adjustment difficult, with a tendency to a rich mixture at speeds above idling.

Acceleration.—If the motor seems to run rich after acceleration at the average driving speed (20 to 30 miles per hour) for a distance, it is due to too much gasoline being supplied from the accelerating pump.

Deceleration.—A decelerating device is used on Schebler Model S-1½" carburetors. If the motor refuses to return to the low idle on cars equipped with this type carburetor there is probably dirt in the device and the device should be taken out and thoroughly washed in clean gasoline.

The decelerating device increases the idling speed temporarily after the throttle has been returned to the idling position from a part or wide open throttle. In other words, if you drive along, say at five miles per hour, kick open the throttle and accelerate to ten or fifteen miles per hour, or to any speed, then let the foot accelerator back to idle, the idling speed will be increased considerably for about ten seconds, when the decelerating device will close off, allowing the motor to idle at the normal speed.

SCHEBLER "S" BRASS BOWL

Control Hook-up. When using the loose lever (N, Fig. 7) the control tubing (R) is fastened in clamp (S) with screw (M) on side of body just below the air funnel. Fasten the control wire (E) in the binding post (O) on loose lever (N) with the throttle closed allowing 1/16" play between the loose lever (N) and the boss it strikes against on lever (P).

When using the lever (F), the control tubing (R) is fastened in the clamp (S) with screw (M) on the bowl. Extend the control wire (E) through the slot in lever (F) with the dash control pushed in; cut off the wire ½" above the top of lever (F). Slip the ball on the wire (E), allowing 1/16" play between the ball and lever; then bend the wire so the ball cannot slip off. Try the lever, which should work freely and not bind on the wire. Any binding will cause the lever (P) to stick which will cut down the gasoline mileage and upset the idle.

Starting.—Open the hand throttle one-half way. Pull out the dash control plunger all the way, retard spark, step on the starter. As soon as the engine starts, push the plunger in about half way and continue to push it in gradually as the engine warms up, until the plunger is entirely in.

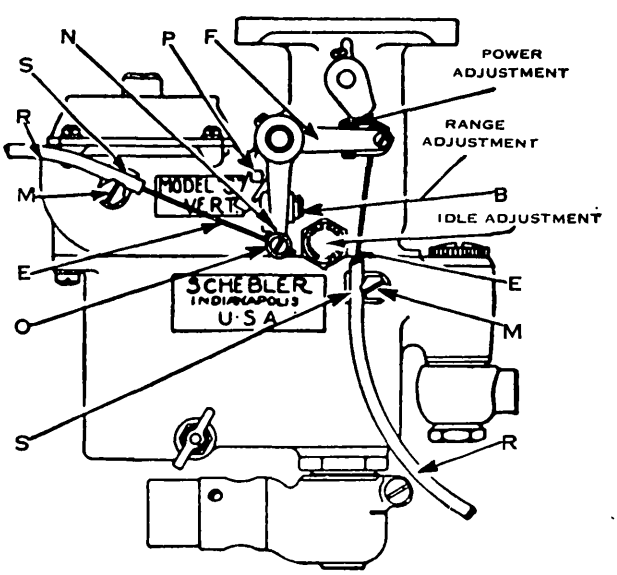


Fig. 7

Schebler Model S Brass bowl type of carburetor showing location of adjustment screws. Float valve seat is not a removable part.

NOTE—Never attempt to make any adjustments on carburetor until motor is hot.

Idle Adjustment.—Turn the idle adjusting knurl (Fig. 7) to the right for a lean mixture, and to the left for a rich mixture. To check the idle adjustment, warm up the motor thoroughly and by this we mean to have a hot motor. Then close the throttle, retard the spark all the way if car has manual spark control and then adjust idle stop screw so that motor will not idle less than five miles per hour on the road. After you have the

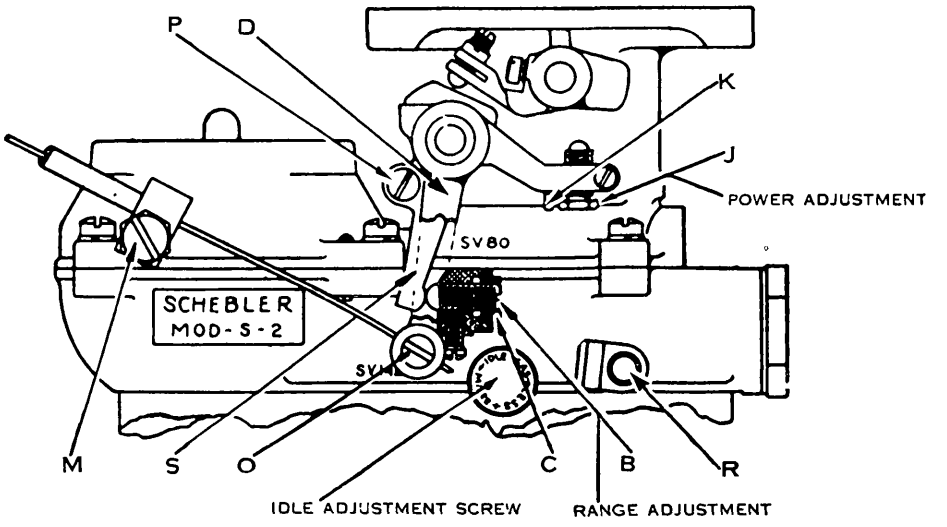


Fig 8

Schebler Model S with die cast bowl showing the three adjustments.

On regular type carburetors (those having brass cast bowl) the float valve seat is not a removable part but is machined in the main bowl casting.

On die cast bowl type the float valve and seat are furnished as a separate assembly.

proper idle engine speed then proceed to check the idle adjustment as follows: Turn the idle adjusting screw to the right (clockwise) turning slowly, watching the motor fan at the same time and continue to turn in this direction, which is the lean direction, until the fan falters or in other words is not turning with a smooth, constant motion. Just as soon as the fan falters stop turning the idle adjustment to the right (lean) and from this point turn the idle adjustment back to the left or rich direction exactly 6 clicks for summer driving and 8 to 9 clicks for winter driving, clicks can be felt while turning the idle adjusting knurl. This will give you an accurate setting on the idle adjustment providing you follow out all of these instructions just as we have outlined them.

Range Adjustment.—This adjustment is only effective in the driving range at speeds from twenty to forty miles per hour and does not effect acceleration or hill climbing with wide open throttle.

The adjustment is made by turning the range adjusting screw (B) to the left for a lean mixture and to the right for a rich mixture in the driving range.

To obtain the factory setting, screw the range adjusting screw (B) in or out so the head is flush with the bushing. If the range adjustment is changed it is necessary to readjust the idle mixture.

Power Adjustment.—This adjustment as shipped from the factory ordinarily need not be changed. This adjustment is not sensitive to one turn in either direction and is only effective for the wide open throttle running. In changing this adjustment try it on a hill after each change for best results. In extreme cases it may be necessary to furnish a leaner or richer mixture for wide open throttle position. The adjusting cam tappet screw is turned to the left (counter-clockwise) to give a richer mixture and turned to the right (clockwise) to give a leaner mixture.

With throttle wide open adjust the cam tappet screw until there is about 1/8 to 5/32 of an inch space between the dash control lever (P) and the end of the range screw (B).

SCHEBLER "S" DIE CAST BOWL

Installation.—The dash control tubing should be fastened securely under the clamp and screw assembly (M, Fig. 8) and the dash control wire should be fastened in the binding post (O) so that there is about 1/32" play between the lug on the loose lever (D) and the screw (P) when the throttle is closed and when slotted end of range screw (B) is flush with knurl bushing (C). After tightening screw in binding post (O), straighten out the control wire so that the loose lever (D) does not bind the dash control lever (S) and cause it to stick open. Operate the dash control several times to check this point.

Another standard dash control hook-up may be made by removing the screw (P) and swinging the loose lever (D) up to a horizontal position, and then replace the screw. There should be at least 1/32" between the lug on the loose lever (D) and this screw, when the range screw (B) is flush with the knurl ferrule (C). The dash control tubing should then be fastened under a clamp and screw assembly at the lug (R). This dash control hook-up should be tested several times as explained above.

Starting and Warming Up.—Turn on ignition switch, step on starting switch button and pull out dash control to extreme position. After motor fires, immediately push dash control about half way back or to the position where the motor will operate satisfactorily. After motor warms up, push dash control back gradually. Do not use dash control any longer than is necessary.

To Start a Hot Motor Do Not Use Dash Control—If trouble is had in starting a hot motor because it is loaded with gasoline, open the hand throttle all the way while cranking with starter until the motor fires, and then close off with the hand throttle just enough to keep the motor from racing until it is cleaned out and runs smoothly.

Idle Adjustment.—Turn the idle adjusting knurl (Fig. 8) to the right for a lean mixture, and to the left for a rich mixture. To check the idle adjust-

ment, warm up the motor thoroughly and by this we mean to have a hot motor. Then close the throttle, retard the spark all the way if car has manual spark control and then adjust idle stop screw so that motor will not idle less than five miles per hour on the road. After you have the proper idle engine speed then proceed to check the idle adjustment as follows: Turn the idle adjusting screw to the right (clockwise) turning slowly, watching the motor fan at the same time and continue to turn in this direction, which is the lean direction, until the fan falters or in other words is not turning with a smooth, constant motion. Just as soon as the fan falters stop turning the idle adjustment to the right (lean) and from this point turn the idle adjustment back to the left or rich direction exactly 6 clicks for summer driving and 8 to 9 clicks for winter driving, clicks can be felt while turning the idle adjusting knurl. This will give you an accurate setting on the idle adjustment providing you follow out all of these instructions just as we have outlined them.

Range Adjustment.—This adjustment is only effective in the driving range at speeds from twenty to forty miles per hour and does not effect acceleration or hill climbing with wide open throttle.

The adjustment is made by turning the range adjusting screw (B) to the left for a lean mixture and to the right for a rich mixture in the driving range.

This adjustment as shipped from the factory will usually be found to be best, unless a lean or richened mixture is necessary at speeds from twenty to forty miles per hour.

To obtain the factory setting, screw the range adjusting screw (B) in or out so the head is flush with the bushing (C). If the range adjustment is changed it is necessary to readjust the idle mixture.

Power Adjustment.—Extensive research indicates that the carburetor will give the best mixture for maximum power on the hills or at high speeds when the power crew (J) is flush with the pin (K) in high altitude, however, more power may be obtained by leaning up on the power mixture—turning (J) to the left (counter-clockwise) 3 to 5 turns.

Accelerating Pump Adjustment.—You will note a small lever on accelerating pump which governs the amount of accelerating gas. This lever should be in the raised position for winter, giving a larger amount of extra gas for acceleration. In the summer this lever should be pushed down because in summer you do not need as much gas for quick acceleration.

SCHEBLER "S" STAMPED BOWL

Control Hook-up, Starting and Adjusting.—When using the loose lever (N, Fig. 9) the control tubing (R) is fastened in clamp (S) with screw (M) and the clip (T) on side of body just below the air funnel. Fasten the control wire (E) in the binding post (O) on loose lever (N) with the throttle closed, allowing 1/16 inch play between the loose lever (N) and the boss (U), it strikes against on lever (P).

When using loose lever (F) the control tubing (R) is pushed through clamp nut (Y) until flush and clamped by tightening nut (Z). The control wire (E) is extended through the binding post (O). Tighten the screw on the binding post, being sure that the control on the dash is pushed down and that there is about 1/16 inch play between the loose lever (F) and the lug (U) on the dash control lever (P).

Starting.—Open the throttle one-half way. Pull out the dash control plunger, retard spark, step on the starter. As soon as the engine starts, push the plunger in half way and push in gradually as the engine warms up, until the plunger is entirely in.

Idle Adjustment.—Turn the idle adjusting knurl (A, Fig. 9) to the right for a lean mixture, and to the left for a rich mixture. To check the idle adjustment, warm up the motor thoroughly and by this we mean to have a hot motor. Then close the throttle, retard the spark all the way if car has manual spark control and then adjust idle stop screw so that motor will not idle less than five miles per hour on the road. After you have the proper idle engine speed then proceed to check the idle adjustment as follows: Turn the idle adjusting screw (A) to the right (clockwise) turning slowly, watching the motor fan at the same time and continue to turn in this direction, which is the lean direction, until the fan falters or in other words is not turning with a smooth, constant motion. Just as soon as the fan falters stop turning the idle adjustment (A) to the right (lean) and from this point turn the idle adjustment back to the left or rich direction exactly 6 clicks for summer driving and 8 to 9 clicks for winter driving, clicks can be felt while turning the idle adjusting knurl (A). This will give you an accurate setting on the idle adjustment providing you follow out all of these instructions just as we have outlined them.

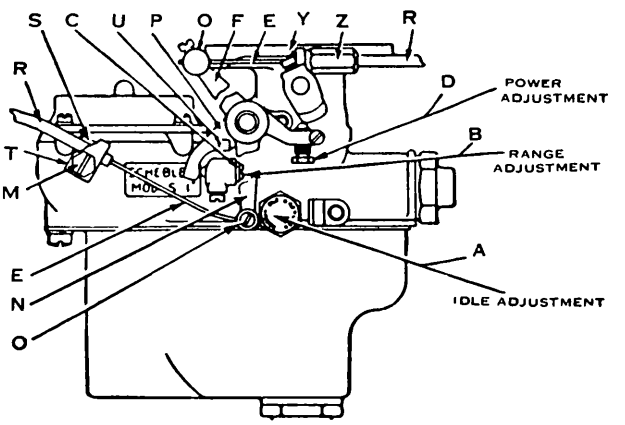


Fig. 9

Schebler Model S stamped bowl showing the three adjustments. On regular type carburetors (those having brass cast bowl) the float valve seat is not a removable part but is machined in the main bowl casting.

On stamped bowl types float valve and seat are furnished as a separate assembly.

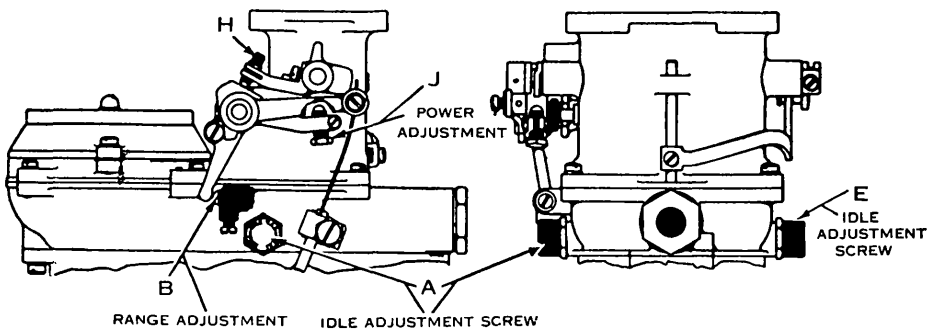


Fig. 10

Schebler Model S Duplex showing two idle and one power adjustment.

The throttle opening and idle adjustment next to the motor controls cylinders numbers 3, 4, 5, 6. The outside throttle opening and idle adjustment controls cylinders numbers 1, 2, 7, 8.

Range Adjustment.—See range adjustment for Schebler model S brass bowl, page 10.

Power Adjustment.—See power adjustment for Schebler model S, page 10.

SCHEBLER "S" DUPLEX

Starting and Warming Up.—Push dash control out to extreme position, turn on ignition switch, release clutch, open hand throttle about one-half way and step on starting switch button. After motor fires, immediately move dash control about half way back or to the position where the car will operate satisfactorily. As motor warms up move dash control further back gradually. Do not use dash control any longer than is necessary. When motor is hot do not use dash control. If trouble is had in starting a hot motor, open the hand throttle half way.

Idle Adjustment.—The duplex carburetor has two idle adjustments (A, Fig. 10) and (E). Before making any carburetor adjustments warm up the motor to average driving temperature. Both adjustments (A) and (E) turn in the same direction for rich and lean. Turning these adjustments to the right (clockwise) makes the mixture leaner and to the left (counter-clockwise) makes the mixture richer.

The duplex carburetor has two throttle openings into the manifold and the throttle opening and idle adjustment next to the motor always control the four center cylinders, numbers 3, 4, 5, 6. The throttle opening and idle adjustment of carburetor which is on the outside next to the hood of the car always governs the two front and two back cylinders, numbers 1, 2, 7, 8.

To adjust the inside idle adjustment next to the motor, disconnect spark plug wires numbers 1, 2, 7, 8 and ground them some place on the motor head. This leaves the four center cylinders numbers 3, 4, 5, 6 operating, which are governed by inside idle adjustment. Run idling adjustment screw (H) in a little way in order to get a slightly faster idle speed which is necessary when checking four cylinders at a time. Retard spark and depress the air valve of the carburetor 1/32 inch to 1/16 inch. If the adjustment is lean on the four center cylinders, numbers 3, 4, 5, 6, the motor will die immediately, if adjustment is too rich motor will speed up. When adjustment is just right, you should be able to depress the air valve 1/32 to 1/16 of an inch and the motor should continue to turn over 2 or 3 revolutions and then start to quit.

To adjust the outside idle adjustment, put the spark plug wires back on numbers 1, 2, 7, 8 plugs and remove wires from numbers 3, 4, 5, 6 and ground them, you are then ready to check the outside idle adjustment by depressing the air valve the same as described above.

After checking the two idle adjustments individually, connect up all spark plug wires so all 8 cylinders will fire and then make a double check by depressing the air valve of the carburetor the same as you did when checking 4 cylinders at a time. Before making your final check with all 8 cylinders firing, check the engine idle speed, setting the idle stop screw (H) so that engine will idle 5 to 6 miles per hour on the road. In making the final check by depressing air valve if you find the job a little rich or lean with all 8 cylinders hooked-up, turn both idle adjustments in the same direction, rich or lean to correct this, turning each one only two or three clicks at a time and then re-check by depressing air valve of carburetor.

Range Adjustment.—This adjustment is only effective in the driving range at speeds from twenty to forty miles per hour and does not affect acceleration or hill climbing with wide open throttle.

The adjustment is made by turning the range adjusting screw (B, Fig. 10) to the left for a lean mixture and to the right for a rich mixture in the driving range.

This adjustment as shipped from the factory will usually be found to be best, unless a lean or richened mixture is necessary at speeds from twenty to forty miles per hour.

To obtain the factory setting, screw the range adjusting screw (B) in or out so the head is flush with bushing. If the range adjustment is changed it is necessary to readjust the idle mixture.

Power Adjustment.—The carburetor will give the best mixture for speed and maximum power on the hills when the bottom of the head of power screw (J, Fig. 10) is setting so that it measures 7/32 inch to the arm that holds screw (J). On the later Duplex carburetors there is a small pin located at the side of screw (J) and the original factory setting is to have the bottom of the head on screw (J) flush with the bottom of the pin. In high altitudes more power can be obtained by leaning up on the power mixture—turning screw (J) to the left (counter-clockwise) 3 to 5 complete turns. Turning screw (J) to the right richens the power mixture.

SCHEBLER MODEL U

Control Hook-Up.—The control hook-up should be made between the dash control tube clamp screw and clip (G, Fig. 12) and the dash control lever (D). The Dash Control should be so adjusted that when the button on the dash is pulled out in the "start" position the lever (D) is down as far as it will go. With the dash control in the "run" position adjust the clamp screw (E) on the wire on lever (D) so that the button sticks out on the dash about ⅛" to be sure that lever (D) is as high as it will go. On the 1¼" (Type U) be sure to thread control wire through the eye in choke wire (F) before running wire into dash control lever (D).

Starting and Warming Up.—Pull dash control to the full out or start position, open the throttle about half way, retard spark, turn on ignition switch and step on starting motor switch button. In very cold weather hold dash control out until the motor fires then move in the control a very short distance to keep the motor firing. In warm weather pull the control out just enough to start the motor. The last part of the dash control motion in the out or start position supplies a very rich starting mixture and should be used for as limited a time as possible.

When warming up after the motor is firing, the control can be put where best operation is obtained, gradually pushing the control to the run or down position.

When the motor is hot do not use the dash control.

If trouble is encountered starting a hot motor do not use the dash control but open the hand throttle half way and without using dash control step on starter.

Important.—Never attempt to make carburetor adjustments until the motor is hot. If you have a temperature gauge on the dash, it should read around 170 degrees before attempting to check the carburetor adjustments. All other units, such as valves, compression, setting of plug gaps, distributor timing, setting of distributor points and brakes, should be checked according to factory specifications and be sure they are O. K.

Idling Adjustment.—The motor should be thoroughly warmed up before adjusting the idle (A, Fig. 12). The spark and throttle should be fully retarded. Turning the end of lever (A) up leans the mixture and turning it down richens the mixture. The markings "R" and "L" on the body also show the rich and lean directions.

The correct idle adjustment should be obtained when pointer is approximately in the center of the range of adjustment between "R" and "L." Allow the motor to idle about one minute and if it rolls from being rich turn the adjustment lean one click at a time until the motor runs steadily. If the motor runs rough from being lean turn the adjustment rich one click at a time until the motor steadies. In warm weather keep the idle adjustment slightly on the lean side. In cold weather set idle rich just under the rolling point.

To change the idle speed adjustment move the idle stop screw (C) in or out to obtain the correct speed. Screwing (C) in will speed up the motor and vice versa. It may be necessary to change the idle adjustment (A) if the idle speed is changed very much. The correct speed is 5 M.P.H. in high gear on level road.

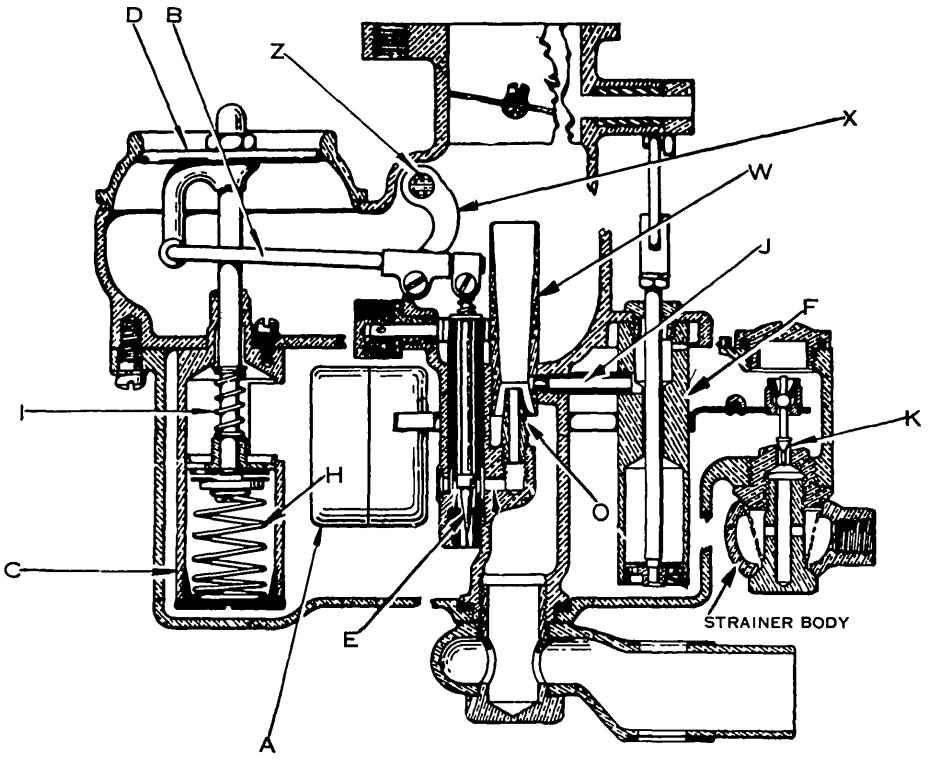


Fig 11

Cross section view of Schebler Model S carburetor showing (A) float (B) needle valve lift lever (C) dash pot assembly (D) air valve (E) needle valve (F) accelerating pump assembly (H) lower air valve spring (I) upper air valve spring (J) metering or cross passage (K) float needle valve assembly (O) main gasoline nozzle (W) venturi (X) fulcrum lever arm (Z) fulcrum lever arm shaft

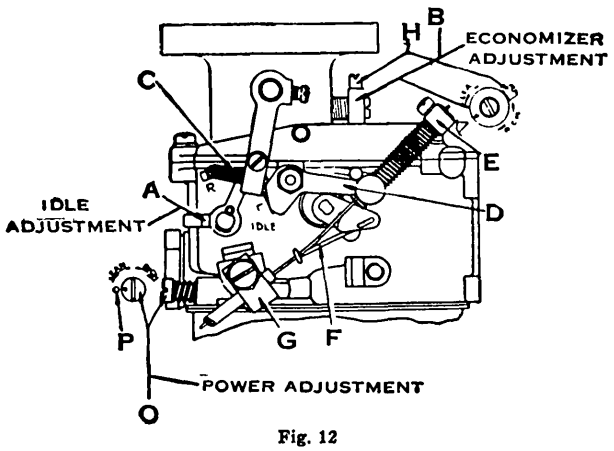


Fig. 12

Schebler Model U showing (A) idle adjustment (C) idle speed adjustment (B) economy adjustment (O) power adjustment.

Economy Adjustment.—The factory setting of the economy adjustment (B, Fig. 12) is shown with the arow mark on the adjustment in line with the arrow mark on the body. To lean the mixture turn the adjustment in the lean direction or counter-clockwise and to richen the mixture turn the adjustment in the rich direction or clockwise.

To accurately check the economy adjustment, warm the motor up thoroughly. Next, retard spark all the way if motor has manual control on spark. Next, with car standing still speed the motor up to a speed corresponding to approximately 30 miles an hour road speed. Do this with the throttle control on the wheel so you can maintain the speed while checking the economy adjustment. With the motor turning over at this speed loosen the lock screw (H) and turn the economy screw (B) out (counter-clockwise) until the motor falters or begins to surge and slow down and at this point, then turn the adjusting screw (B) in (clockwise) until you just get away from the surging point and motor is hitting on all cylinders. This will give you an accurate setting on the economy adjustment. Be careful not to turn screw (B) in too far because if you do you will have a rich setting on economy, but turn it in just enough to get away from the surging of the motor.

After checking this adjustment accurately, hold the economy adjusting screw (B) so it will not move and turn the collar so that the arrow on the collar is in line with the arrow on the body and then lock the collar by tightening set screw (H).

Note: Changing economy adjustment does not affect idle adjustment in any way.

Power Adjustment.—The wide open throttle adjustment can be richened by turning power adjustment screw (O, Fig. 12) in (clockwise) and can be made leaner by turning it out (counter-clockwise).

This adjustment should generally be used only for high altitude conditions, or when special fuels are used. The factory setting for this adjustment is when the head of screw (O) is flush with end of pin (P) at the side of the screw and the punch mark on (O) pointing to pin (P).

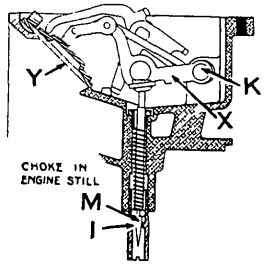


Fig 14

Cross section of air valve and control levers Model U Schebler carburetor (K) air valve lift lever fulcrum (M) needle valve (X) air valve lift lever (Y) air valve.

This adjustment affects the economy adjustment (B) and if any change is made in power adjustment (O), the economy adjustment (B) will have to be reset as explained above by setting just above the surging point of the motor. If power adjustment (O) is richened say one-fourth turn, then lean (B) economy adjustment one-fourth turn, or if (O) is leaned one-fourth turn, then richen (B) one-fourth turn.

Remember that the power or wide open throttle adjustment is correct when it leaves the factory except for special cases as mentioned above. Also remember that it is very important to reset the Economy Adjustment (B), if any change is made in Adjustment (O).

The Power Adjustment is not used on the 1″ size.

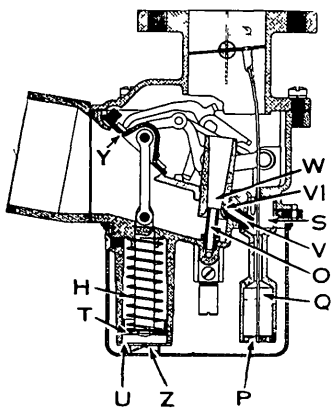


Fig 13

Cross section of Model U Schebler carburetor showing (H) air valve spring (O) main gasoline nozzle (P) accelerating pump piston (Q) accelerating pump assembly (T) air valve piston (U) dash pot relief valve (V) cross passage to venturi (V1) cross passage metering hole (W) venturi (Y) air valve (Z) dash pot cylinder relief valve spring.

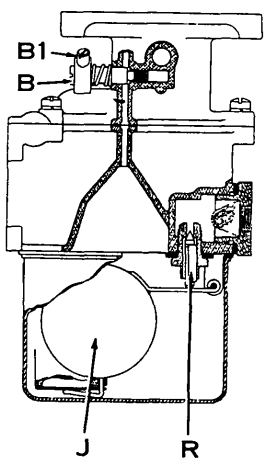


Fig 15

Cross section of Schebler Model U carburetor showing float valve assembly and economy adjustment (B) economy adjustment screw (B1) economy adjustment lock (J) float (R) float needle valve assembly.

STROMBERG MODEL R

This carburetor is of the Plain Tube type so-called because, having no air valves or metering

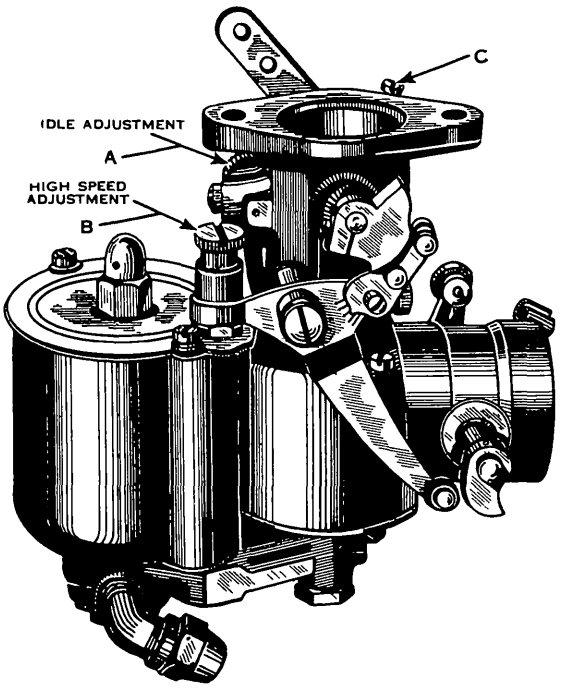


Fig 16
Stromberg Model R carburetor with economizer showing location of adjustment screws

needles, both the air passages and fuel jet are of fixed size for all engine speeds Its construction is such that the proper mixture is supplied for all speeds, an exact setting being made possible by the provision of separate and easily regulated High and Low Speed Adjustments The special patented "Accelerating Well" construction gives a powerful and prompt response to the throttle with an economical mixture setting A new Low Speed Adjustment is fitted to give smooth and steady idle and low speed operation a priming device has also been incorporated in the idling system, which facilitates starting by automatically furnishing a rich priming charge when the engine is cranked

Use of Choke Control.—For starting and warming up with the present day fuel, it is absolutely necessary to use the choke control until the proper operating temperature is attained Ordinarily the engine will start readily with the control closed one-half to three-quarters of the way In very cold weather it may be necessary to pull the control up all the way, but this should be done only for an instant, as this cuts off all the air and delivers raw gasoline only In starting with electric starter, the throttle should be nearly closed, or better still, it may be successively opened part way and closed while the starter turns the engine over Never keep this control up more than a moment at a time

If, after continued use of the Control, the engine refuses to start, it may be that too much fuel has been fed Returning the Control all the way down, and cranking the engine over with the throttle wide open will overcome this loading condition and allow the engine to start

For hand cranking the Control should be one-half to three-quarters up and the throttle should be just barely open In cold weather the Control should be pulled all the way up with the throttle barely open, for two or three turns of the crank, then the Control should be set at one-half to three-quarters and the crank given several more turns, when the engine should start

When the engine is cold, it is best not to open the throttle so far that the engine misfires, as this is a frequent cause of sooted spark plugs and fuel in the crankcase

The High Speed, or main driving adjustment, is regulated by the High Speed Needle (B), Fig 16, turning this down (clockwise) gives less fuel, up (counter-clockwise) more

To obtain an exact adjustment, advance spark lever to normal driving position, set throttle lever on steering wheel to a position which will give about twenty-five miles per hour speed on a smooth level road, then adjust High Speed Needle to the minimum opening that will give smooth running, and the maximum engine speed for that throttle opening This should give a good average adjustment, though several notches less opening may give best economy for continuous driving or touring, and one or two notches more may prove most satisfactory for short runs in cold weather, when the engine does not get up to normal heat

If the engine fires unevenly, as indicated by an irregular exhaust sound at the muffler outlet, at part throttle opening, regardless of mixture adjustment, this is probably due to the valves of the engine not seating tightly or their being held open by insufficient tappet clearance If the engine misses at full open throttle on what otherwise seems to be a proper mixture adjustment, there may be insufficient heat on the intake manifold or the ignition system may be at fault

The Idling Mixture and closed throttle running, up to about eight miles per hour, are controlled by the Idle Adjustment Lever (Fig 16) This lever is locked in position by a notched quadrant which has letters "L" (lean), and "R" (rich), stamped at either end Moving the lever either way will give a leaner or richer mixture as indicated

For engine to idle steadily, it is usually necessary that the spark plug terminal gap be not less than 032" also the intake manifold above the carburetor must feel at least warm to the hand

If, after adjusting the Low Speed Adjustment as above described to give steady running, the engine idles too fast, turn the small Throttle Stop Screw (C) to the left or counter-clockwise until the proper idling speed is reached If engine idles too slow and stops, turn screw (C) to the right or clockwise until proper speed is reached

In all cases adjustment should be made when the engine is normally warm In cold weather the fuel economy and satisfaction of driving will be increased by the use of radiator covers or other means of keeping the water temperature above 120° F

STROMBERG MODEL OO-2

The Model OO is a twin or duplex carburetor employing the standard Stromberg construction,

along with the following improvements:

A single High Speed Adjustment operating equally on both barrels.

Individual Idle Adjustment for each barrel.

A thermostat control of the accelerating well, which automatically gives best operation at both warm and cold temperatures.

A Warming Up Control of the high speed needle when the choke is operated, which gives improved starting and warming up.

Starting and Warming Up.—For starting in warm weather with engine already warm, throw on the switch, step on the starter and at the same moment depress the accelerator pedal slightly, when engine should take hold. For starting, open the throttle lever on steering wheel slightly, till accelerator button can be left to move downward, throw on switch and simultaneously depress starter button and pull out control all the way from one to five seconds then return control slightly as engine begins to fire, also opening throttle a little further if engine is very cold. Do not crank engine with control all the way out more than fifteen seconds continuously as this floods the carburetor unnecessarily; stopping a moment will allow the unvaporized gasoline to drain out.

For Hand Cranking in cold weather, open the throttle as above described, and pull up Control Button all the way during two or three turns of the crank, then return the control about one-fourth of the way and give the crank several more turns, when engine should start.

The High Speed Adjustment (B, Fig. 17) is the lower and vertical one, and controls the fuel feed to both barrels. To readjust, advance spark and open the throttle to a position that will give at least 30 miles per hour speed on a level road. Be sure that the choke button on dash is all the way down, as closing choke raises the high speed needle. Cut down the fuel feed by screwing the adjustment

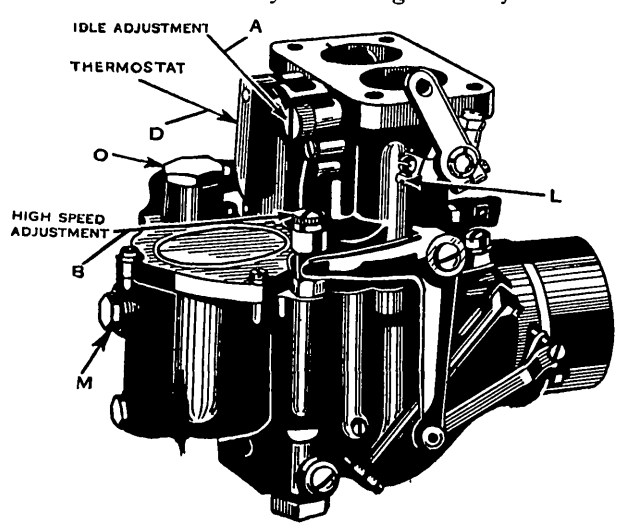


Fig. 17

Stromberg Model 00-2 showing adjustments and fuel economizer device. If carburetor floods continuously (a certain amount of dripping of unvaporized gasoline from the intake manifold may be expected after stopping in cold weather) remove strainer plug (O) and clean strainer.

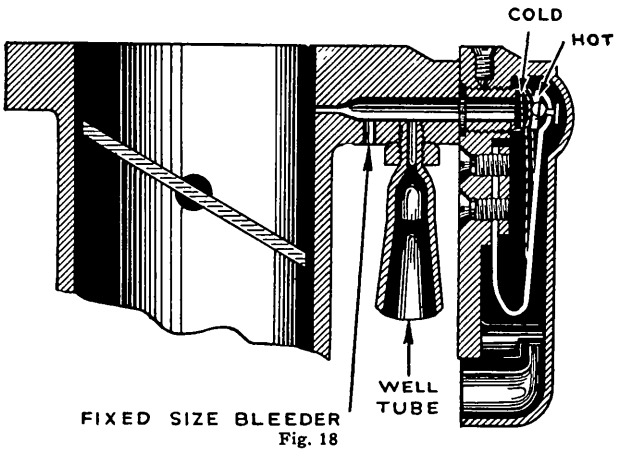


Fig. 18

Accelerating well thermostat used on Stromberg Model 00-2. These thermostats are put up in a self-contained unit with self-locking steel cover and are not intended to be repaired except at the Stromberg factory.

clockwise till engine begins to lose speed, then unscrew counter-clockwise till absolute maximum engine speed is obtained for that throttle position. If adjustment is too lean, engine will warm up slowly and not show normal power. If the adjustment is made at too low a speed and too small a throttle opening, it is rather easy to set it too lean.

The Idling Adjustments (A, Fig. 17) are the two horizontal upper knurled screws: these control the idling gasoline feed so that screwing them in gives less fuel, outward more; ordinarily they will need to be only one-fourth to one full turn off the seat. To readjust, with engine warm, carefully set the throttle stop screw (L) to give the lowest idling speed desired, then vary the position of each idling adjustment in turn till smoothest idling is obtained. The spark lever on steering wheel may be all the way or half retarded. It will be found that the action of the throttle stop screw is quite delicate, for the reason that the engine can get enough air to idle from two throttles with a very small opening; it may, therefore, be necessary to set up the throttle stop screw to compensate for wear on its end, after the car has been used a month or so.

The Thermostat.—In the past it has been found that any accelerating well adjustment made for good winter operation may give bad flat spots in the summertime from too much gasoline in the accelerating charge. Whereas if the accelerating charge is cut down in summer to the amount necessary with the high temperature then existing under the hood, the acceleration may be poor in the winter time and the car hard to warm up and drive. The thermostat control device gives the correct amount of accelerating charge in both winter and summer and thereby smooth operation at all seasons. These thermostats are put up in a self-contained unit Fig. 18 with self-locking steel cover and are not intended to be repaired except at the Stromberg factory. With proper high speed adjustment, the engine should respond properly to the throttle any time that it has been warmed up enough to pull steadily against the brake at 6 miles per hour with the throttle wide open.

Buick 1925-30

Motor Tune-up

Nine operations are included in the tune-up of a Buick automobile motor. The special notes are important and should be carefully observed.

Tune-up Operations

1. Clean and adjust distributor and spark plug points.
2. Check the ignition timing.

   Note: See that the full range of spark advance and retard is obtained when the manual advance lever is moved to its limit in either direction.
3. Adjust the valve tappets and free up valves.
4. Clean gas line strainers and screens; also check gas lines for loose fitting.
5. Check heat control valve.
6. Check throttle valve for opening.
7. Check for clogged radiator.

   Note: This is necessary only when the car is troubled with heating.
8. Check fan belt; adjust if necessary.
9. Adjust carburetor.

Gasoline Mileage and Motor Performance

Ignition Timing.—It is possible for the ignition timing to be out enough to affect the gasoline mileage and not seriously affect the motor performance at moderate car speeds. Check for loose or worn advance control linkage.

Two methods for timing the ignition are explained under ignition timing below. The piston travel method is the quickest and should always be used in cases where the flywheel has been installed with the timing marks in the wrong position.

Valve Tappet Adjustment. — Extreme care should be exercised when adjusting the valve tappets. Tight valve tappets will cause a loss of gasoline mileage. The valve tappet adjustment should be made with the motor running at idling speed. Set the tappets so that a feeler gauge will just pass freely between the valve stem and the rocker arm.

Carburetor Air Adjustment.—The air valve spring should never be stretched under any circumstances. If the spring is weak it should be replaced with a new one. Stretching the spring will result in the wrong spring tension at different positions of the air valve and cause a loss of gasoline mileage due to an excessive amount of fuel being drawn from the low speed jet.

Fuel Pump.—The fuel pump body has a small hole drilled in the side just under the diaphragm. If the diaphragm should become porous or leaky the gasoline will pass through the diaphragm and out to the ground through the hole in the side of the body, thus causing a loss in gasoline mileage. Replace the diaphragm with a new one.

Motor Noise

Valve Stems.—A sticky valve stem not exaggerated enough to cause a miss may cause a valve knock. This trouble can be checked out by removing the valve cover and grasping the rocker arms with the fingers directly over the point of contact with the valve stem. If the stem is sticky the shock can be felt through the fingers. This condition can generally be relieved by pouring a good grade of penetrating oil down the stem and turning the valve to a new position.

OIL PRESSURE

Model and Year	Min.	Max.
Master Six—1925	20 lbs.	25 lbs.
Standard Six—1926	30 lbs.	45 lbs.
Master Six—1926	20 lbs.	25 lbs.
Standard Six—1926	30 lbs.	45 lbs.
Master Six, 120, 128—1927-28	20 lbs.	25 lbs.
Standard Six, 115—1927-28	30 lbs.	45 lbs.
Master Six, 121, 129—1929	20 lbs.	25 lbs.
Standard Six, 116—1929	20 lbs.	25 lbs.
Series 40 (118")—1930	35 lbs.	40 lbs.
Series 50 and 60 (124"-132")—1930	28 lbs.	30 lbs.

IGNITION TIMING

Buick, all Models, 1925-29, and Series 40, 1930.—Two methods for timing the ignition on Buick automobiles are given below. The first method is by flywheel travel and the second method is by piston travel. Of the two methods, the piston travel method is the quickest.

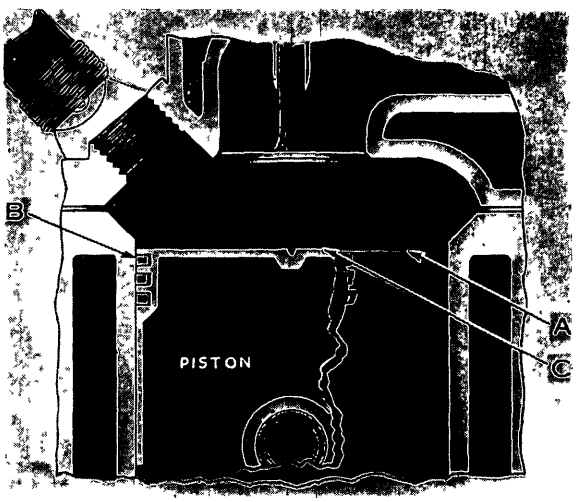


Fig. 1

Cross section of Buick combustion chamber and cylinder showing top of piston in position for timing ignition. With top of piston in this position, timing mark on flywheel rim will register with indicator mark at peekhole in flywheel housing.

The early six cylinder Buick flywheels were stamped with a 7° mark only. The later models had both 7° and 17° marks, while the latest models have only the 17° mark except Standard Six 1929 and Series 40, which have a 15° mark. Breaker contacts should just begin to separate when the 7°

Ignition Timing Table

Complete ignition timing data will be found in the following table. The degree marks on the flywheel rim can be seen through the peekhole in the flywheel housing.

Year	Model	Con Pt Clear	IGNITION TIMING			Spark Lever Position	Plug Gap	Firing Order
			Fly-Wheel Travel	Piston Travel	Dead Center Position			
1925	Master 6	020″	*7°		A T C	Ret	025″	1-4-2-6-3-5
1925	Standard 6	020″	*7°		A T C	Ret	025″	1-4-2-6-3-5
1926	Master 6	020″	*17°		B T C	Adv	025″	1-4-2-6-3-5
1926	Standard 6	020″	*17°		B T C	Adv	025″	1-4-2-6-3-5
1927-28	Master 6 (120″-128″)	018″	*17°		B T C	Adv	025″	1-4-2-6-3-5
1927-28	Standard 6 (114½″-115″)	018″	*17°		B T C	Adv	025″	1-4-2-6-3-5
1929	Master 6 (121″-129″)	018″	*17°		B T C	Adv	025″	1-4-2-6-3-5
1929	Standard 6 (116″)	018″	*15°		B T C	Adv	025″	1-4-2-6-3-5
1930	Series 40 (118″)	018″	*15°		B T C	Adv	† 025″	1-4-2-6-3-5
1930	Series 50-60 (124″-132″)	018″	*17°		B T C	Adv	† 025″	1-4-2-6-3-5

A T C —After top center B T C —Before top center Ret —Spark lever fully retarded Adv —Spark lever fully advanced

*All models of Buick are provided with flywheel marks for ignition timing

†The recommended plug gap setting for late models is from 025″ to 030″ but if the motor hesitates or misses an 018″ to 020″ setting should be tried

mark (on the flywheel rim) is under the indicator spark fully retarded or when the 17° or 15° mark, as the case may be, is under the indicator, spark fully advanced (see table of ignition data above for contact point clearance).

To time the motor by the piston travel method, remove the spark plug from No. 1 cylinder. With a pocket flashlight held in such a position that the cylinder wall can be observed through the spark plug hole (Fig 1), note that the cylinder wall is bright up to the point (A) where the top piston ring (B) stops at the top of the stroke.

Crank the motor with the piston on compression stroke until the bright portion of the cylinder wall is just covered by the top of the piston (C). At this point, with the spark lever fully advanced, the contact points should just start to separate. With the piston in this position, if the flywheel is properly installed, the 17° mark on the flywheel will be directly under the indicator.

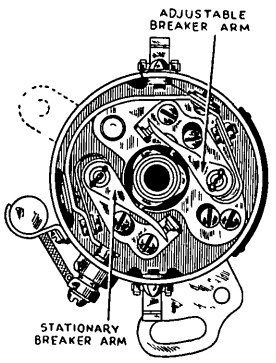


Fig. 2

Top view of ignition breaker box used on Buick Series 50 and 60 showing stationary and movable set of contact points. The stationary contacts fire cylinders 1-2-3 and the movable set fire cylinders 4-5-6.

Buick Series 50 and 60, 1930.—The distributors on these models have two sets of breaker arms and a three lobe cam (Fig. 2). The stationary set of points fire cylinders 1-2-3 and the movable set fire cylinders 4-5-6.

Set the contact points to the correct clearance as given in the timing table. Using either piston or flywheel timing procedure as given above, rotate the distributor housing so that the stationary set of contact points just begin to separate when piston No. 1 is in firing position (17° mark on flywheel) on compression stroke with spark fully advanced.

Next crank the motor over one complete revolution. This brings No. 6 piston into firing position. The movable set of contacts should then be adjusted so that the points just begin to separate with spark lever fully advanced.

VALVE TIMING

Buick Six, All Models, 1925-28 Inclusive.—Adjust the valve tappets for No. 1 cylinder to .010″ cold. The intake valve for No. 1 cylinder should just begin to open, when the mark for inlet valve 1-6 appears under the indicator mark in the flywheel housing.

Buick, All Models 1929-30.—No valve timing marks are provided on the flywheel for 1929 and 1930 Buick models. The valves should be timed by piston travel with the aid of a piston timing gauge. The intake valve on the Series 40 should start to open .002″ piston travel (1° flywheel travel) past top dead center.

The intake valve on Series 50 and 60 should just start to open .105″ piston travel (17°-54′ or approximately 2½″ flywheel travel) past top dead center.

The above timing specifications are given for a valve lash of .012″.

Valve Timing Table

The following table contains valve timing data for all models of Buick from 1925 to 1930 inclusive. All tappet adjustments are made with hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running (Hot)		Fly-Wheel Travel	Piston Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh				
1925	Master 6	010″		008″	010″	*0°-50′B		Opens	
1925	Standard 6	010″		008″	010″	*0°-50′B		Opens	
1926	Master 6	010″		008″	010″	*0°-50′B		Opens	
1926	Standard 6	010′		008″	010″	*0°-50′B		Opens	
1927	Master 6 (120″-128″)	010″		008″	010″	*0°-50′B		Opens	
1927	Standard 6 (114½″)	010″		008″	010″	*0°-50′B		Opens	
1928	Master 6 (120″-128″)	010″		† 008″	008″	*T D C		Opens	
1928	Standard 6 (115″)	010″		† 008″	008″	*T D C		Opens	
1929	Master 6 (121″-129″)	010″		† 008″	008″	*17°-54′A		Opens	
1929	Standard 6 (116″)	010″		† 008″	008″	*2°A		Opens	
1930	Series 40 (118″)	012″		† 008″	008″	*1°A	002″A	Opens	
1930	Series 50-60 (124″-132″)	012″		† 008″	008″	*17°-54′A	105″A	Opens	

A —After top center B —Before top center. T D.C —Top dead center

*All models of Buick have flywheel marks for valve timing except 1929 and 1930 models

†Beginning with 1928 models a faster acting valve camshaft was used On these models the valve tappets should be adjusted with care and accuracy to avoid noisy tappets

GAS LINE SCREENS

On cars having a gasoline strainer bowl mounted under the vacuum tank there are three strainers in

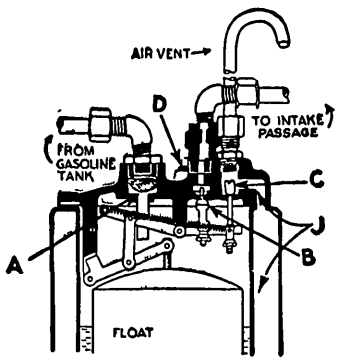


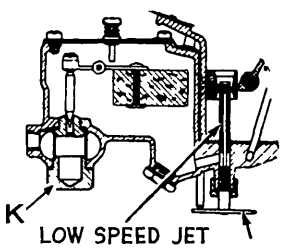
Fig. 3

The upper half of vacuum tank showing position of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

the gasoline line to the carburetor. One is located in the top of the vacuum tank, the second is located under the vacuum tank, and the third is at the carburetor.

Fig. 4

Section of Marvel carburetor used on Buick showing location of fuel strainer at bottom of carburetor bowl. To clean, remove hexagon stud (K).



To clean the gas line screen in the top of the vacuum tank disconnect the gas line from the gasoline supply tank, remove the elbow and bushing together with the gasoline strainer. Clean with gasoline and air.

The strainer under the vacuum tank is provided with a detachable glass bowl and shut off valve for stopping the gasoline flow when cleaning is necessary.

To clean the gas line screen at the carburetor remove hexagon plug (K, Fig. 4). Remove the gauze strainer, wash thoroughly in gasoline and blow out with air. Clean the inside of the strainer body thoroughly.

All models of Buick equipped with fuel pump feed have two strainer screens in the gasoline line located in the top of the gasoline bowl at the fuel pump (Fig. 5).

A second strainer screen is located at the carburetor.

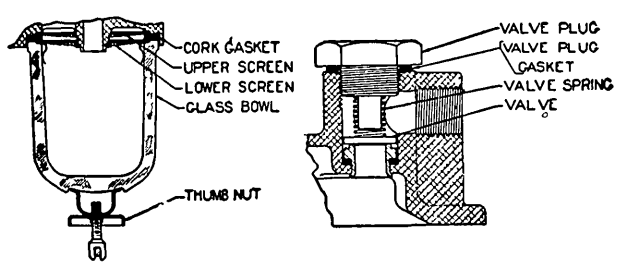


Fig. 5

Cross section view of fuel pump glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. . . . The valve disc is held in position by spring which in turn is held in place by the valve plug. If valve plug is removed see that valve plug gasket is in good condition when plug is replaced.

To clean the fuel pump screens, remove the glass bowl by removing the thumb nut shown in the illustration. Clean the screens by washing them in clean gasoline and blowing them out with air. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new one.

FUEL PUMP

In the event of no fuel in the carburetor, the system should be checked for leaks or split seams in the gas line or the gas line becoming jammed or flattened by the automobile body resting upon it. Occasionally due to the fact that the gasoline line extends to the bottom of the gas tank, a little sediment is drawn from the bottom of the tank, blocking out the flow of fuel.

Other troubles which may be corrected without disturbing the fuel pump installation are, loose pipe fittings at the gasoline tank or the pump, loose glass bowl which should be tightened by the retaining nut, making sure that the cork gasket lies flat on its seat and is not broken.

Loose Valve Plug.—Tighten the valve plug securely. If necessary, replace the valve plug gasket.

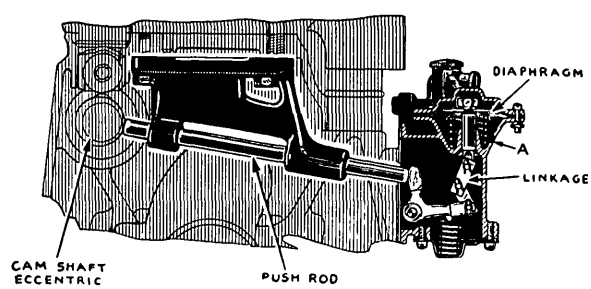


Fig. 6

Cross section view of fuel pump showing drive from camshaft used on Buick 1929. Note hole (A) in side of full pump body below diaphragm through which fuel escapes in event of a porous or leaky diaphragm.

Leaks at the Diaphragm.—Tighten the cover screws evenly and securely. Shellac should be applied to the edge of the diaphragm (Fig. 6) either under the diaphragm on the surface which comes in contact with the fuel pump body or on the outside of the body at the point where the diaphragm protrudes. Sometimes there appears to be a leak at the diaphragm whereas the leak actually exists at the pipe fitting and has run down the pump body to the diaphragm flange, appearing to originate there.

Carburetor Specifications

FLOAT LEVEL

Buick all Models 1925-26-27-28.—Float level height from top edge of float bowl to top of float should measure 9/16″ at a point directly under air adjustment screw (Fig. 7) when float is in raised position.

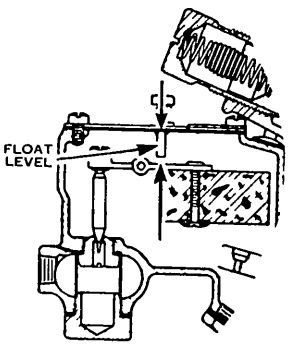


Fig 7
Float level should be measured at a point directly under air adjustment screw Adjustment should be taken with float valve closed and float in raised position

Buick all 1929-30 Models.—The top of float should be 19/64″ from top edge of float bowl when valve is seated (Fig. 7)

Examine float needle valve, if worn replace with new valve Do not attempt to grind or replace this valve

Inspect the float valve seat This should have only an indication of a seat Edge should be sharp or nearly so.

CARBURETOR SPECIFICATION DIAGNOSIS

Buick 1925.—The following specifications are for Marvel Model T-4-S carburetors used on all 1925 models of Buick

Float valve seat: Edge should be sharp or nearly so

Low speed gasoline nozzle Hole should be No 63 drill size

Meter pin: Should be straight, no wear on sides

Meter pin jet: Hole should be No 43 drill size

Air adjustment screw: Inside of screw should be smooth Clearance between plunger and shell should not exceed 006″

Air valve spring: Spring should be Marvel No 24 115 It should have a free length of 1½″, is made with a number of closed coils at the center and is zinc plated

Air valve: Should be free on its shaft but have very little play Contact of valve on carburetor body should show contact for the entire curved position

High speed nozzle: Jet should be No 56 drill size Tip of jet should be 2 17/32″ from the floor

Throttle fit in riser body. Shaft should be an easy running fit Use a 302″ reamer in holes

Buick 1926-27-28.—The following specifications are for Marvel Model T-3 and T 4 carburetors used on Buick 1926-27-28

Float valve seat: Edge should be sharp or nearly so

Gasoline adjustment needle: Should be straight and show no groove at the end

Low speed gasoline nozzle: Hole should be No 63 drill size for 114½ and No 59 drill size for 120″ and 128′ wheel base models

Meter pin: Should be straight and show no wear on sides Hole should be No 44 drill size for 114½ and No 43 drill size for 120″ and 128″ wheel base models

Air adjustment screw: Inside of screw should show no rough spots Clearance between plunger and shell should not exceed 006″

Air valve spring: Spring should be Marvel No 24-115 with a free length of 1½″ made with a number of closed coils in center and zinc plated on all 114½, 120 and 128 wheel base models

Air valve: Should be free on its shaft but have very little play and should show contact for the entire curved position

High speed nozzle: Jet should be No 55 drill size for 114½″ and No 53 drill size for 120″ and 128″ wheel base models Tip of jet should be 2 9/16″ from floor for 114½″ and 3″ for 120″ and 128″ wheel base models

Throttle fit in riser body: Shaft should be an easy running fit Use a 5/16″ reamer in holes

Buick 1929.—The following specifications are for Marvel T-3 and T-4 carburetors used on Buick Series 116″, 121″ and 129″

Description	116″ Series	121″-129″ Series
Air Intake Dia	1⅞″	2″
Air Valve Dia	1⅞″	2⅛″
Air Valve Spring	No 24-115	No 24-114
High Speed Jet	No 49-100-C-33	No 49-120-D-28
Intermediate High Speed Jet	No 49-125-A-10	No 49-150-A-10
Low Speed Nozzle	No 47-7	No 47-7
Meter Pin Jet	No 84-43C	No 84-43C
Meter Pin	No 173-528	No 173-528
Venturi Dia	13/32″	13/32″

Low Speed, High Speed and Intermediate Nozzles.—These are sized by use of a flow meter at the Marvel factory and do not correspond to standard drill sizes Parts number is stamped on each nozzle for identification

Air Adjustment Screw.—Inside of screw should show no rough spots Use reamer Clearance between plunger and shell should be no more than 006″

Air Valve Springs.—For the 116″ Series, the spring should be No 24-115 which has a free length of 1½″, is made with a number of closed coils at the center section and is zinc plated For the 121″-129″ Series, the spring should be No 24-114 which has a free length of 1½″ but has no closed coils It is zinc plated

Air Valve.—Air valve should be free on its shaft but have very little play Check contact of valve on carburetor body It should show contact for the entire curved portion

Throttle Fit in Riser Body.—Shaft should be an easy running fit Use a 5/16″ reamer

Inspect inside of heat jacket of riser If carbon is present, same may be removed by burning with oxygen flame

Buick 1930.—The following specifications are for Marvel T-3-S and T-4-S carburetors used on Buick Series, 40, 50 and 60

Description	40 Ser	50 60 Ser
Throttle Diam	1 7/16″	1¾″
Air Valve Diam	2″	2⅛″
Air Intake Diam	2″	2″
Air Valve Spring	No 24-315	No 24 114
High Speed Jet	No 49 120 C 20	No 49 120 C 28
Int High Speed Jet	No 49-150-E 22	No 49-160-E-24
Low Speed Nozzle	No 47-150-A	No 47-160-A
Metering Pin Assem	No 173-528	No 173-528
Metering Pin Jet	No 84 090 C	No 84 088 C
Venturi Diam	13/32″	13/32″

ALTITUDE CHANGES

Buick 1929 Models.—For altitudes above 4,000 feet the following jets are recommended instead of the standard jets as listed in the preceding table of carburetor specifications

	116″ Series	121″ 129″ Series
High Speed Jet	49-95-C-33	49-90-D-28
Intermediate High Speed Jet	49-90-A-10	49-125-A-10

For some engines which have a slight miss at speeds from 25 to 35 miles per hour the following changes are recommended for both the 116″ and the 121″-129″ Series. (See Fig. 8).

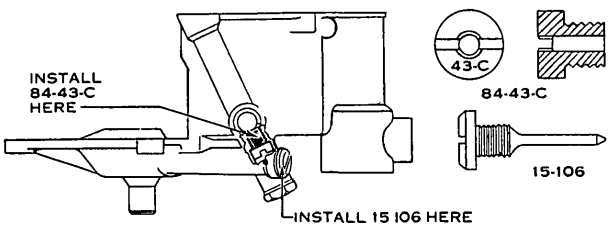


Fig. 8

Section of Marvel carburetor used on 1929 Buick Six, showing jet changes for altitudes above 4000 feet.

Replace the high speed channel plug screw with screw No. 15-106. In addition install new metering pin jets No. 84-43-C.

Buick 1930 Models.—No change is necessary for touring through mountainous country, but for cars operating permanently in territory of 4000 feet elevation or over we advise changing to 40-90-C-28 High Speed Jet for Series 50, 60 and 49-110-C-20 High Speed Jet for Series 40. It will also be necessary to change to 49-135-E-24 Intermediate High Speed Jet on Series 50-60 and 49-110-E-22 Intermediate High Speed Jet on Series 40.

Do not, under any circumstances, make this change unless operating permanently above 4000 feet elevation.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and year	Model	Engine	No. cyl.	Bore and stroke	Carb. model and size
BUICK					MARVEL
1925	Master 6	Own	6	3 3/8"x4 3/4"	T-4S
1925	Standard 6	Own	6	3"x4 1/2"	T-3S
1926	Master 6	Own	6	3 3/8"x4 3/4"	T-4
1926	Standard 6	Own	6	3 1/8"x4 1/2"	T-3
1927-28	Master 6 120, 128	Own	6	3 1/2"x4 3/4"	T-4
1927-28	Standard 6 115	Own	6	3 1/8"x4 1/2"	T-3
1929	Master 6 121, 129	Own	6	3 5/8"x5"	T-4
1929	Standard 6 116	Own	6	3 1/16"x4 5/8"	T-3
1930	Ser 40	Own	6	3 1/16"x4 5/8"	T-3S-1 1/2"
1930	Ser 50, 60	Own	6	3 3/4"x5"	T-4S-1 3/4"

Early models of Buick from 1925 to 1928 were equipped with carburetors having two jets, while later models 1929 to 1930 are equipped with carburetors having three jets.

All models are equipped with manifold heating devices which must be properly adjusted to obtain efficient carburetor performance. Complete operation and adjustment information for each type of manifold heat control will be found following the adjustment information for each Buick model.

ADJUSTMENT PRECAUTIONS

When trouble is experienced with lack of power or failure to obtain a correct carburetor adjustment check for the following:

1. Weak air valve spring (see carburetor specifications).
2. Hole in intake heat manifold riser.
3. Improper throttle adjustment; see that the throttle valve has its full range of movement at wide open throttle.

For best power and economy all fixed carburetor jets should be renewed at least once every 20,000 miles and the carburetor should be thoroughly overhauled. This is especially true in sandy or alkaline districts.

BUICK 1925

Choke.—A choke button is provided on the instrument board to assist in starting. Pulling out this button closes a butterfly valve in the air intake passage of carburetor which restricts the air opening of the carburetor, and consequently produces a richer mixture. This button should be released at once upon starting.

Starting.—To start engine, set heat control lever to top or "Heat On" position, pull out choke button all the way. Advance spark lever about half way and throttle lever about one-quarter way and depress starter pedal.

The moment the engine fires, the choke button should be pushed in to closed and the engine allowed to run at a fairly good speed for quarter to half minute. If engine hesitates, pull out choke button and push back in at once, the object being to secure momentarily a richer mixture to assist engine in warming up. Even in zero weather it is not necessary to run with choker out. It should be borne in mind that the automatic heating system of the carburetor makes it entirely unnecessary to drive with choker pulled out and one of the objects of the heating system is for this purpose, thereby obviating the common practice of diluting the oil in the crankcase by using an excess amount of fuel while engine is warming up.

An over rich mixture will cause the engine speed to fluctuate through more or less regular periods from high to low speeds.

The best adjustment is obtained with the fuel and air valve set as described. It must be remembered that too lean a mixture as well as an over rich mixture causes over-heating and loss of power and is not as economical as an adjustment which provides just the proper proportion of gasoline and air.

Gasoline Idle and High Speed Air Screw Adjustment.—No change should be made in the carburetor adjustments until after an inspection has been made to determine if the trouble is in some other unit. It should be noted that the vent hole is open in filler cap of main tank, that the gasoline lines are clear, that there is gasoline in the vacuum tank, that there are no leaks at connections between carburetor and engine, that the ignition system is in proper condition, and that there is even compression in all cylinders.

Set air screw (Fig. 9) so that the end is flush with the end of ratchet spring. Turn gasoline ad-

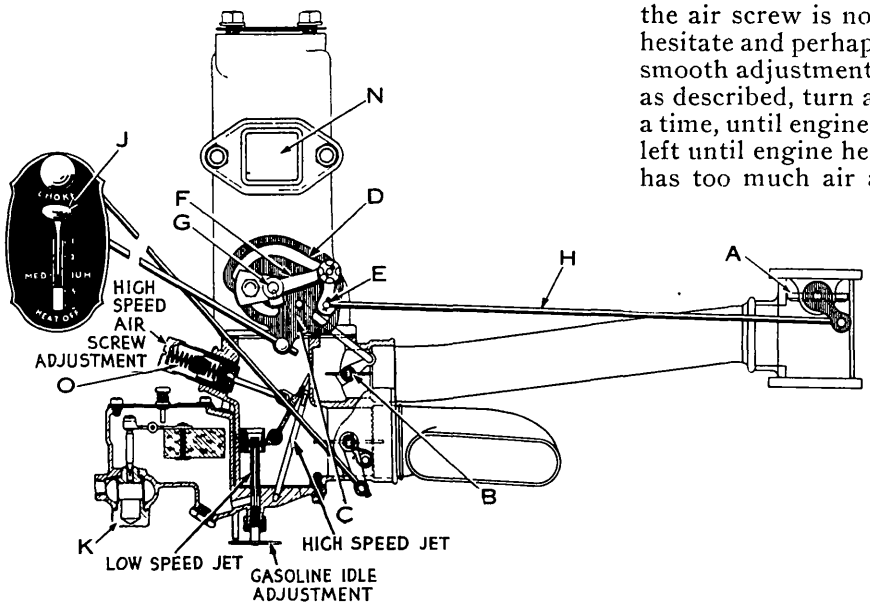


Fig. 9

Cross section of Marvel carburetor showing gasoline idle and high speed air adjustment screw. This carburetor was used on early model Buicks and has two jets as shown. The high speed jet is located under the air valve. There are two adjustments on this carburetor. The gasoline adjustment on the low speed jet and the high speed air adjustment.

justment to the right very carefully so as not to injure the needle point, until the valve is closed gently against its seat. Then turn to the left to bring the notch in the disc handle directly below the guide post above it.

Note: Proper carburetor adjustment cannot be obtained if the air valve spring (O) is weak. (See carburetor specifications for air spring dimensions and data.)

If trouble is experienced with idle adjustment and loading at high speeds check for hole burned in intake heat manifold riser.

The notch in disc handle of needle is put in handle after the needle has been carefully calibrated by a flow-meter at the factory, therefore the notch in handle should register with guide post above it. This setting of needle valve is absolutely essential to get the best results. The object in directing that needle be first turned to the right until closed is to insure against two or more turns open, as from closed position to notch (usually about one turn) is the normal setting. This being true it is not necessary to turn needle in to the right firmly but merely far enough to be sure that when turning back to the left to the notch registering with guide post, that the needle is not more than once around or one turn from its seat.

Set heat control lever (J) on dash at "Heat On" or No. 2 position, and leave it in this position while making adjustment. Pull out choker to closed position and start engine in usual manner. As soon as engine has fired release choker. Run for a moment until engine has warmed up, remembering not to use choker oftener than necessary, as, when not needed, it has a tendency to foul up engine and ruin the lubricating oil in the crankcase.

Next, set air screw for good idle by either turning in to the right a little or backing out to the left as the needs of the engine require, remembering that first of all, the needle must be set as described. With the needle so set and the engine warmed up, the adjustment of the air screw for proper idling is easily accomplished by using a little care. If the air screw is turned in too tight, the motor will roll. If the air screw is not tight enough, the motor will hesitate and perhaps stop entirely. To make a nice, smooth adjustment for idle, first having set needle as described, turn air screw in quarter of a turn at a time, until engine does roll; then turn back to the left until engine hesitates, indicating that mixture has too much air and is too lean; next turn air screw in to the right three or four notches at a time until engine runs smoothly. This accomplished (and it is very easy to do by proceeding as directed above) the proper adjustment for the entire range of the engine will have been attained, thus insuring the best economy and power.

If the engine idles too fast with throttle closed, the latter may be adjusted by means of the throttle lever adjusting screw.

Mixtures.—It should be remembered that the position of the heat lever largely controls the effect of rich or lean action on the mixture. Therefore, if driving in traffic where quick acceleration is desired, drive with heat enough to provide same. On straight-away driving the heat lever may be set half way down the slot to "Medium" and in extremely warm weather below that point or even down to bottom of slot or "Heat Off" position.

Caution.—It must be remembered that the low speed needle has been carefully calibrated to notch in disc handle and guide post above it, at the factory and that in making an adjustment that the needle must be so set and the rest of the adjusting done with the air screw as described, never varying from described needle setting unless in extreme cold weather, when a little more gas may be carried, or turning off a little when casing head gas is used in hot weather.

MANIFOLD HEAT CONTROLS

Heat Control (Marvel Model T-3S and T-4S).—The carburetor and manifolds have been designed to utilize the exhaust gases of the engine to ensure complete vaporization and a consequent minimum consumption of fuel. This is accomplished by surrounding the upper portion of the carburetor body with a jacket connecting to a double-walled riser placed between the carburetor and the intake manifold. This riser is also connected to the exhaust manifold in such a manner that the exhaust gases pass between the walls of the riser, through the heat jacket of carburetor and the outlet tube to the

exhaust pipe. The amount of heat thus furnished to the riser and carburetor jacket is controlled by two valves; one in the exhaust pipe above the outlet tube from carburetor and one in the outlet of carburetor heat jacket.

The valve in the exhaust pipe is connected to the throttle lever of carburetor in such a manner that the greatest amount of heat is had in the jackets of riser and carburetor when the throttle is only partly open, as in idling and at low speeds, and a decreasing amount as the throttle is opened further for higher speeds. By means of the heat control lever on instrument board this automatic action of the heat valve may be varied to suit weather and driving conditions.

The valve described above in main exhaust line at front of engine, has a shaft which has a slot in the end. This slot indicates position of damper and may be used as a guide in assembling control rod to carburetor, the normal position of slot being horizontal when heat control lever on dash is set at "Heat On" position and throttle closed.

The control lever operates the valve in the outlet of the carburetor heat jacket simultaneously with the valve in exhaust pipe and an adjustment by moving dash control lever to "No Heat" may be had to the point where no exhaust gases pass through the riser and carburetor jacket, thereby shutting off the heat.

Gases from exhaust manifold enter at opening (N) (see Fig. 9) and pass through riser and carburetor jacket, returning to exhaust pipe below valve (A).

It will be noted in cut that valve (A) is connected by means of connecting rod (H) to roller (E) operating in slot (D) of cam (C). The roller (E) is connected by means of a short, loose jointed, free lever, to lever (F) which in turn is attached in fixed position to throttle shaft (G). As throttle is opened, valve (A) is also opened due to the roller (E) at end of connecting rod (H) following the slot (D) in cam plate (C). Thus the volume of heat through heat jackets of riser and carburetor body will be lessened as the engine speed increases, depending upon the position of the cam (C) controlled by lever (J). Owing to action of slot (D) in cam (C) on position of valve (A) as throttle is opened valve (A) is caused to remain practically closed (thus insuring most heat) until engine has attain a speed of approximately forty miles per hour, after which in higher speeds it opens automatically and rapidly to "wide open" thus insuring against back pressure and overheating.

The valve (B) in carburetor heat outlet is connected by a lever and link to the cam (C), the position of which is controlled by the lever (J), as stated. In the warm-up position it will be noted in cut that this valve (B) is held wide open.

The "Medium" setting of control lever should be used as soon as engine is warm and will give the best economy and performance under normal driving and weather conditions. If weather is raw and cold, drive with lever (J) further up toward top of slot; if temperature of air is 90° or above, drive with lever (J) below middle of slot.

For economy and best engine performance it is essential that driving be done with control lever (J) as near center, or medium position as driving and weather conditions permit.

In "Heat Off" position, owing to the cam (C) position being still further changed by the control lever (J) on instrument board, the valve (A) at closed throttle position is already open partially, and opens quickly with throttle to full wide open position. At the same time it will be noted that valve (B) has been closed by cam (C), thus insuring in this setting no heat circulation to the system.

This is the setting used during extremely hot weather or under certain heavy road conditions when engine appears to lose power because of too much heat.

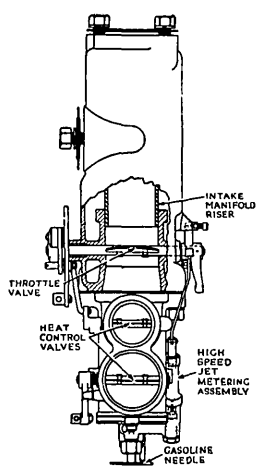


Fig. 10

Cut-away section of Marvel carburetor used on Buick 1925 showing the riser assembly, heat control valve and high speed jet metering assembly. The metering assembly is controlled mechanically by the throttle at high speeds. . . . Difficulty in obtaining a correct carburetor adjustment may be due to a hole being burned in the intake manifold riser.

BUICK 1926-27-28

Starting.—A choke button is provided on instrument board just above heat control lever. This button is connected by a rod to the lever which operates the butterfly in air passage of carburetor. Button should be pulled out when starting and pushed in about three-quarters of the way immediately the engine starts and all the way in as soon as engine is warm. Rod between button and lever is threaded on lever end and should be of such length that the butterfly will be fully open when button is all the way in.

Gasoline Idle and Air Screw Adjustment.—No change should be made in the carburetor adjustment until after an inspection has been made to determine if the trouble is in some other unit. It should be noted that the vent hole is open in filler cap of main tank; that the gasoline lines are clear; that there is gasoline in the vacuum tank; that there are no leaks at connections between carburetor and engine; that the ignition system is in proper condition and that there is even compression in all cylinders.

If it is necessary to test adjustment or to make a readjustment, proceed as follows:

Set air screw (Fig. 11) so that the end is flush with the end of ratchet set spring. Turn gasoline adjustment to the right very carefully, so as not to injure the needle point, until the valve is closed

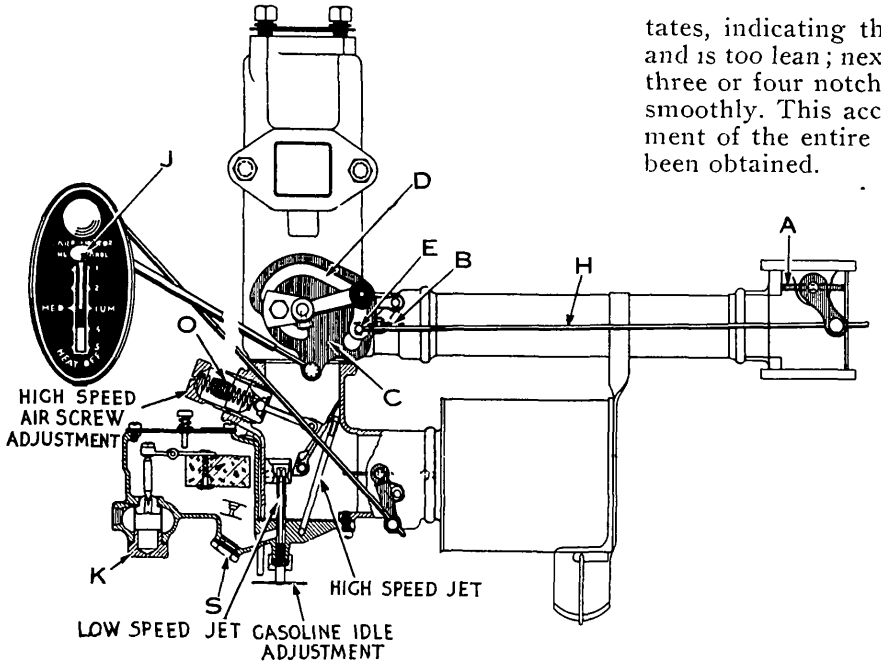


Fig. 11

Sectional view of Marvel carburetor used on Buick 1926-28 showing gasoline idle and high speed air screw adjustment. These models were equipped with air cleaners. . . . To remove sediment from the gasoline bowl, take out hexagon plug (S).

gently against its seat. Then turn to the left approximately one complete turn, which will bring the notch in the disc handle directly in line with the guide post above it.

The notch in disc handle of needle is put in after the needle has been carefully calibrated by a flowmeter at the factory. This setting of needle valve is absolutely essential to get the best results in power and economy.

Note: Proper carburetor adjustment cannot be obtained if the air valve spring (O, Fig. 11) is weak. (See carburetor specifications for air spring dimensions and data).

If trouble is experienced with idle adjustment and loading at high speeds check for hole burned in intake heat manifold riser.

This setting should not be changed except in extreme cold weather; it may be necessary to enrichen the mixture by opening the needle slightly, or when using a highly volatile gas, the needle may be closed slightly to make mixture lean. The necessity for such variation from standard setting should be determined by the action of the engine when idling.

Set heat control lever (J) on dash at "Heat On" position and leave this in position while making adjustment. Pull out choker to closed position and start engine in usual manner. As soon as engine has fired release choker three-quarters of the way in. Run until engine has warmed up, then push choker all the way in.

Set air screw for good idling by either turning to the right for a richer mixture or to the left for a lighter mixture, as the needs of the engine require, remembering that the needle must be set as described above, and the engine thoroughly warmed up. If the air screw is turned too tight, the motor will roll. If the air screw is not tight enough, the motor will hesitate and perhaps stop entirely. To test the idling adjustment, turn air screw in a quarter of a turn at a time until engine does roll; then turn back to left until engine hunts or hesitates, indicating that mixture has too much air and is too lean; next turn air screw in to the right three or four notches at a time until engine runs smoothly. This accomplished, the proper adjustment of the entire range of the engine will have been obtained.

If the engine idles too fast with throttle closed, the latter may be adjusted by means of the throttle lever adjusting screw.

Air Cleaner.—The container at the bottom of the air cleaner in which the particles of dust and dirt have been collected should be removed at least once during each season and cleaned out.

Heat Jacket of Riser.—If carbon is present, same may be removed by hydrogen flame.

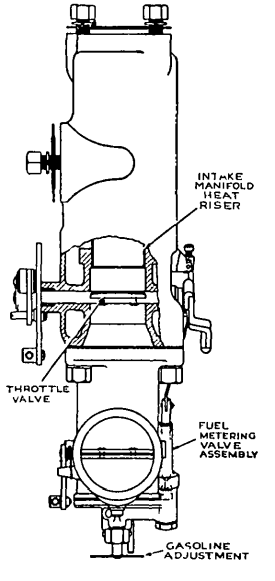


Fig. 12

Cut-away section of Marvel carburetor used on Buick 1926-28, showing intake manifold heat riser, fuel metering valve assembly for high speed jets and throttle valves If trouble is experienced in obtaining a correct carburetor adjustment inspect manifold heat riser for hole burned in wall.

MANIFOLD HEAT CONTROL

Heat Control.—The carburetor and manifolds have been designed to utilize the exhaust gases of the engine to insure complete vaporization and a consequent minimum consumption of fuel. This is accomplished by surrounding the upper portion of the carburetor body with a jacket connecting to a

double walled riser placed between the carburetor and the intake manifold. This riser is also connected to the exhaust manifold in such a manner that the exhaust gases pass between the walls of the riser, through the heat jacket of carburetor and the outlet tube to the exhaust pipe. The amount of heat thus furnished to the riser and carburetor jacket is controlled by two valves; (A, Fig. 11) in the exhaust pipe above the outlet tube from the carburetor and (B) in the outlet of carburetor heat jacket.

Valve (A) in the exhaust pipe is connected to the throttle lever of carburetor in such a manner that the greatest amount of heat is had in the jackets of riser and carburetor when the throttle is only partly open, as in idling and at slow speeds, and a decreasing amount as the throttle is opened further for higher speeds. By means of the heat control lever on instrument board, this automatic action of the heat valves may be varied to suit weather and driving conditions.

The control lever operates valve (B) in the outlet of the carburetor heat jacket simultaneously with valve (A) in exhaust pipe and adjustment, by moving dash control lever to "No Heat", may be had to the point where no exhaust gases pass through the riser and carburetor jackets.

It should be remembered that the position of the heat lever largely controls the amount of fuel consumed, since the more heat applied, the more fuel will be used. Therefore, if driving in traffic where quick acceleration is desired, drive with heat enough to provide same. On straight-away driving, the heat lever may be set halfway down the slot and in extremely warm weather below that point or even down to bottom of slot or "Heat Off" position.

Valve (A, Fig. 11) is connected by rod (H), pin (E), which carries a roller operating in slot (D) of cam plate (C). Valve (A) should be in contact with wall of valve body when throttle is closed. To check setting, disconnect rod at pin (E) and with throttle closed and lever which operates valve (A) set forward as far as it will go, adjust length of rod so that the connection can be slipped on pin (E). If it is found that valve (A) rattles at idling speed, shorten rod two or three threads.

As throttle is opened, roller at (E) will follow circular portion of cam and no movement of valve will occur until engine has obtained a speed which will correspond to a car speed of approximately 40 miles per hour. Movement of valve (A) then is rapid and heat in riser will be lessened as throttle approaches full opening.

BUICK 1929

(Marvel Carburetor Model T-3 and T-4)

The carburetors used on Buick 1929 models vary in construction from those used on earlier models. The construction embodies a main body or mixing chamber and a conventional float chamber bowl with fuel strainer attached at point of entrance of fuel to bowl. Within the mixing chamber are three nozzles which proportion the amount of gasoline used in the mixture. One of these nozzles called the "low speed" is situated in a venturi and may be regulated by the gasoline adjustment needle at bottom of carburetor. The other two called "high speed" and "intermediate high speed" (Fig. 13) are located under the automatic air valve and are of fixed opening and non-adjustable. An air screw is provided which regulates the pressure of the air valve spring enclosed therein. Within this screw is also enclosed a plunger connected by a link to the air valve. The function of this plunger is to provide a resistance in addition to that of air valve spring to assist in acceleration. This arrangement of plunger and air valve screw is termed the dash pot.

As in the earlier types of carburetor used on Buick a further control of the high speed jets is provided by the fuel metering valve operated by the carburetor throttle. This valve provides the maximum fuel feed to the high speed jets when the carburetor is fully opened for high speed and for quick pick-up. During the ordinary driving ranges this valve controls the amount of fuel being used, thus providing all the economy possible. This valve is entirely automatic and requires no adjustment.

Starting.—To start engine, set heat control lever (J, Fig. 13) to top or "Heat On" position, pull out choke button all the way. Advance spark lever about half way and throttle lever about one quarter way and depress starter pedal.

The moment the engine fires the choke button should be pushed in to closed and the engine allowed to run at fairly good speed for quarter to half minute. If engine hesitates, pull out choke button and push back in at once, the object being to secure momentarily a richer mixture to assist engine in warming up. Even in zero weather it is not necessary to run with choker out. It should be borne in mind that the automatic heating system of the carburetor makes it entirely unnecessary to drive with choker pulled out and one of the objects of the heating system is for this purpose, thereby obviating the common practice of diluting the oil in the crankcase by using an excess amount of fuel while engine is warming up.

It should be remembered that the position of the heat lever largely controls the pick-up and acceleration of car. Therefore, if driving in traffic where quick acceleration is desired, drive with heat enough to provide same. On straight-away driving the heat lever may be set half way down the slot to "Medium" and in extremely warm weather below that point or even down to the bottom of slot or "Heat Off" position.

Gasoline Idle and Air Screw Adjustment.—No change should be made in the carburetor adjustments until after an inspection has been made to determine if the trouble is in some other unit. It should be noted that the vent hole is open in filler cap of main tank, that the gasoline lines are clear, that there is gasoline in the vacuum tank, that there are no leaks at connections between carbu-

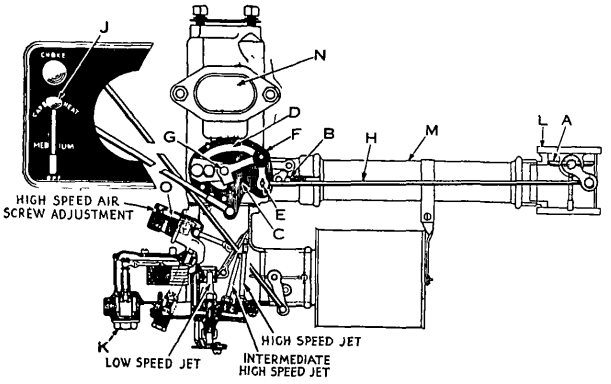


Fig 13

Sectional view of Marvel carburetor used on Buick 1929 showing high speed air adjustment, high speed jet, intermediate high speed jet and low speed jet The needle valve setting should not be changed except in exceptionally cold weather.

retor and engine, that the ignition system is in proper condition, and that there is even compression in all cylinders.

If it is necessary to test adjustments or to make a readjustment, proceed as follows:

Set air screw so that the end is flush with the end of ratchet spring. Turn gasoline adjustment until the notch in the disc handle is directly below the guide post above it.

The notch in disc handle of needle is put in handle after the needle has been carefully calibrated by a flow meter at the factory, therefore, the notch in handle should register with guide post above it. This setting of needle valve is absolutely essential to get the best results.

Set heat control lever (J) on dash at "Heat On" or No. 2 position, and leave in this position while making adjustment. Pull out choker to closed position and start engine in usual manner. As soon as engine has fired release choker. Run for a moment until engine has warmed up, remembering to never use choker oftener than necessary, as when not needed it has a tendency to foul up engine and ruin the lubricating oil in the crankcase.

Note: Proper carburetor adjustment cannot be obtained if the air valve spring (O, Fig. 13) is weak. (See carburetor specifications for air spring dimensions and data).

If trouble is experienced with idle adjustment and loading at high speeds, check for hole burned in intake heat manifold riser.

Next, set air screw for good idle by either turning in to the right a little or backing out to the left as the needs of the engine require, remembering that first of all, the needle must be set as described. With the needle so set and the engine warmed up, the adjustment of the air screw for proper idling is easily accomplished. If the air screw is turned in too tight, the motor will roll. If the air screw is not tight enough, the motor will hesitate and perhaps stop entirely. To make a nice clean adjustment for idle, first having set needle as described, turn air screw in quarter of a turn at a time until engine does roll; then turn back to the left until engine hesitates, indicating that mixture has too much air and is too lean; next turn air screw in to the right three or four notches at a time until engine runs smoothly. This accomplished, the proper adjustment for the entire range of the engine will have been attained, thus insuring the best economy and power.

If the engine idles too fast with throttle closed, the latter may be adjusted by means of the throttle lever adjusting screw.

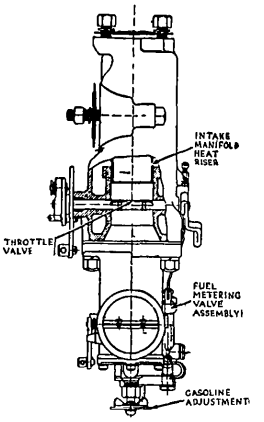
Caution.—It must be remembered that the low speed needle has been carefully calibrated to notch in disc handle and guide post above it, at the factory and that in making an adjustment that the needle must be so set and the rest of the adjusting done with the air screw as described, never varying from described needle setting unless in extreme cold weather, when a little more gas may be carried, or turning off a little when casing head gas is used in hot weather.

MANIFOLD HEAT CONTROL

Manifold Heat Control.—The carburetor and manifolds have been designed to utilize the exhaust gases of the engine to insure complete vaporization and a consequent minimum consumption of fuel. This is accomplished by the use of a double walled riser which carries the throttle placed between the carburetor and the intake manifold. This riser is connected to the exhaust manifold in such a manner that the exhaust gases pass between the walls of the riser, and through the outlet tube from riser to the exhaust pipe. The amount of heat thus furnished to the riser jacket is controlled by two valves; one in the exhaust pipe above the outlet tube from riser and one in the outlet of riser heat jacket.

Fig. 14

Sectional view showing Marvel carburetor manifold heat riser, also full metering valve used on Buick 1929.
If trouble is experienced in obtaining a correct carburetor adjustment, inspect manifold heat riser for hole burned in wall.



The valve in the exhaust pipe is connected to the throttle lever of carburetor in such a manner that the greatest amount of heat is had in the jackets of riser when the throttle is only partly open, as in idling and at slow speeds, and a decreasing amount as the throttle is opened further for higher speeds. By means of the heat control lever on instrument board this automatic action of the heat valve may be varied to suit weather and driving conditions.

The valve described above in main exhaust line at front end of engine, has a shaft which has a slot in the end. This slot indicates position of damper

and may be used as a guide in assembling control rod to carburetor, the normal position of slot being horizontal when heat control lever on dash is set at "Heat On" position and throttle closed.

The control lever operates the valve in the outlet of riser heat jacket simultaneously with the valve in exhaust pipe and an adjustment by moving dash control lever to "No Heat" may be had to the point where no exhaust gases pass through the riser jackets, thereby shutting off the heat.

Gases from exhaust manifold enter at opening (N, Fig. 13) and pass through riser jacket, returning to exhaust pipe through outlet tube (M) to a point below valve (A) in damper body (L).

It will be noted in cut that valve (A) is connected by means of connecting rod (H) to roller (E) operating in slot (D) of cam (C). The roller (E) is connected by means of a short, loose jointed, free lever, to lever (F) which in turn is attached in fixed position to throttle shaft (G). As throttle is opened, valve (A) is also opened due to the roller (E) at end of connecting rod (H) following the slot (D) in cam plate (C). Thus the volume of heat through heat jackets of riser will be lessened as the engine speed increases, depending upon the position of the cam (C) controlled by lever (J). In the cut showing "Heat On" or warm up position owing to action of slot (D) in cam (C) on position of valve (A) as throttle is opened, valve (A) is caused to remain practically closed (thus insuring most heat) until engine has attained a speed of approximately forty miles per hour, after which in higher speeds it opens automatically and rapidly to wide open, thus insuring against back pressure and overheating.

The valve (B) in riser heat outlet is connected by a lever and link to the cam (C), the position of which is controlled by the lever (J), as stated. In the warm up position it will be noted in cut that this valve (B) is held wide open.

In medium driving position, owing to the cam (C's) position having been changed from "Heat On" by the control lever (J) on instrument board to half way down in slot on "Medium", the valve (A) now opens directly with the opening of the throttle, thus insuring less heat than in the "Heat On" position but sufficient for normal driving.

The "Medium" setting of control lever should be used as soon as engine is warm and will give the best economy and performance under normal driving and weather conditions. If weather is raw and cold, drive with lever (J) further up toward top of slot; if temperature of air is 90° or above, drive with lever (J) below middle of slot.

For economy and best engine performance it is essential that driving be done with control lever (J) as near center, or medium position, as driving and weather conditions permit.

In "Heat Off" position, owing to the cam (C's) position being still further changed by the control lever (J) on instrument board, the valve (A) at closed throttle position is already open partially, and opens quickly with throttle to full wide open position. At the same time it will be noted that valve (B) has been closed by cam (C), thus insuring in this setting no heat circulation to the system.

This is the setting used during extremely hot weather or under certain heavy road conditions when engine appears to lose power because of too much heat.

BUICK 1930

(Series 40, 50 and 60)

The carburetor is a Marvel, automatic air valve, multiple nozzle type.

This instrument consists of a main body or mixing chamber to which is attached a float chamber bowl, a double walled heat riser, in which the throttle is carried, heated by gases from the exhaust manifold under automatic control of a damper valve and an exhaust outlet pipe.

Within the mixing chamber are three non-adjustable nozzles which proportion the gasoline for a proper mixture. One of the nozzles, called the "low speed," is located in the center of the venturi which is a fixed air opening. The other two nozzles, called "high speed" and "intermediate high speed," are located just under the air valve and controlled by it. An air adjustment screw is provided for regulating the pressure of the air valve spring enclosed therein and is the only mixture adjustment required. Within this screw is also enclosed a plunger connected by a link to the air valve. The function of this plunger is to provide a resistance in addition to that of air valve spring to richen the mixture for acceleration. This arrangement of plunger, spring and hollow screw is termed the dash pot.

A further control of the "high speed" and "intermediate high speed" jets is provided by the "economizer," which is a fuel metering valve operated by the carburetor throttle. This valve provides the maximum fuel feed to these nozzles when the throttle is fully opened for high speeds, hard pulling, and for quick "pick-up." During the part throttle driving range this valve controls the amount of fuel being used, thus providing all the economy possible. This valve is entirely automatic and requires no adjustment.

Choke.—A choke button is provided on instrument board which by means of a lever operates the butterfly in the air passage of carburetor. When starting the engine this button should be pulled all the way out during the first few revolutions of the engine.

The moment the engine fires the button should be pushed all the way in and the engine allowed to run at fairly good speed for quarter to half minute. If engine hesitates, pull out choke button and push back in at once, thus securing momentarily a richer mixture to assist engine in warming up. Even in zero weather it is not necessary to run with choker out. The automatic heating system of the carburetor makes it entirely unnecessary to drive with choker pulled out, and one of the objects of the heat control system is to obviate the common practice of diluting the engine oil by using an excess amount of fuel when engine is warming up.

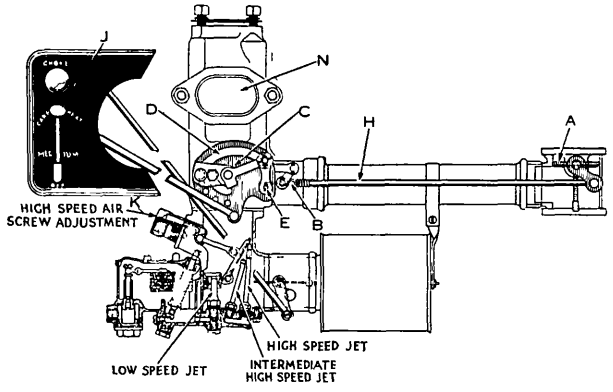


Fig 15

Sectional view of Marvel carburetor used on Buick 1930 showing high speed air adjustment, high speed jet, intermediate high speed jet and low speed jet.

Adjustment of Carburetor.—No change should be made in the carburetor adjustment until an inspection has been made to determine if the trouble is in some other unit. It should be noted that the gasoline lines are clear; that the fuel pump is operating; that there are no leaks at connections between carburetor and heat riser or at manifold; that the ignition system is in proper condition and that there is even compression in all cylinders.

If it is necessary to test adjustments or to make a readjustment, proceed as follows:

Set air screw so that the end is flush with the end of ratchet set spring (K, Fig. 15). Set heat control lever on dash at "heat on" position and leave this in position while making adjustment. Start engine in the usual manner. When engine has warmed up slightly, set air screw for good idling by turning to the right for a richer mixture or to the left for a leaner mixture, as the needs of the engine require.

If the air screw is turned too tight, the engine will roll. If the air screw is not tight enough, the engine will hesitate and perhaps stop entirely. To test the idling adjustment, turn air screw in a quarter of a turn at a time until engine does roll; then turn back to the left until engine hesitates, indicating that mixture has too much air; next turn air screw in to the right three or four notches at a time until engine runs smoothly. This accomplished, proper adjustment for power and economy throughout the entire range of the engine will have been obtained.

If the engine idles too fast with throttle closed, the latter may be adjusted by means of the throttle lever adjusting screw.

Heat Control.—The carburetor and manifolds have been designed to utilize the exhaust gases of the engine, to insure complete vaporization and a consequent minimum consumption of fuel. This is accomplished by a double walled riser placed between the carburetor and the intake manifold. The riser is also connected to the exhaust manifold in such a manner that the exhaust gases pass between the walls of the riser and through an outlet tube to the exhaust pipe. The amount of heat thus furnished to the riser is controlled automatically by two valves; (A) in the exhaust pipe above the outlet tube from the carburetor and (B) in the outlet of the riser jacket (see Fig. 15).

Valve (A) in the exhaust pipe is connected to the throttle lever of carburetor in such a manner that the greatest amount of heat is had in the jacket of the riser when the throttle is only partly open, as in idling and at low speeds, and a decreasing amount as the throttle is opened further for higher speeds.

Valve (A) is connected by rod (H) to pin (E) which carries a roller operating in slot of cam plate (C). This valve should be horizontal when throttle is closed and heat control lever on instrument board is at the top of slot or heat "On" position. A slot in the end of the valve shaft which is parallel with the valve may be used as a guide in assembling the control rod to throttle lever link.

As throttle is opened, roller at (E) will follow circular portion of cam and no movement of valve will occur until engine has obtained a speed which will correspond to a car speed of approximately 40 miles per hour. Opening of valve (A) then is rapid and heat in riser will be lessened as throttle approaches full opening.

A control lever on the instrument board provides a means of changing this automatic action of the heat valves to suit weather and driving conditions. Movement of this lever changes the position of the cam plate (C) in such manner that the initial setting of the heat control valves (A and B) are varied. When lever is at the top of the slot the greatest amount of heat is furnished to the riser and adjustment may be had by moving lever downward to the point where no exhaust gases pass through the riser.

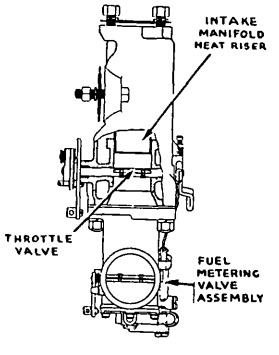


Fig 16

Sectional view showing Marvel carburetor heat riser, also fuel metering valve used on Buick 1930 models. If trouble is experienced in obtaining a correct carburetor adjustment inspect manifold heat riser for hole burned in wall

When driving in traffic where quick acceleration is desired, drive with heat enough to provide same. On straight-away driving, the heat lever may be set half way down the slot, and in extremely warm weather below that point or even down to bottom of slot to "heat off" position.

Cadillac and La Salle 1925-30

Motor Tune-up

Important.—A complete motor tune-up includes all of the following operations. It may not be necessary in every case to do all the operations in order to make the motor perform properly, but in stubborn cases where results cannot be obtained each operation should be carefully checked.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check the ignition timing.
3. Remove and thoroughly clean the carburetor; check the float level and thermostat adjustment; check the gap of the air valve and adjust the tension on the auxiliary throttle valve.

   Note: Adjust valve tappets before replacing carburetor; valve covers cannot be removed with carburetor in place.
4. Clean gas line screens.
5. Scrape carbon.
6. Set valve tappets and check valve timing.

   Note: This operation is necessary only in cases where proper engine performance cannot be obtained. It is necessary to remove carburetor to get valve tappet covers out. The cylinder block should be tightened before adjusting valve tappets.
7. Check choke valve for position.

   Note: Incorrect choke setting, due to choke rod length changing in service will cause too rich mixture and may make a correct carburetor adjustment impossible.
8. Check heat control for proper setting.

   Note: If heat controls are left closed, they may burn out exhaust gaskets.
9. Inspect and replace defective water hoses.

Ragged Idle

Spark Plug Adjustment.—The motor will not idle properly if the spark plug electrodes are spaced too close together. When setting spark plug point clearance inspect the grounded electrode and adjust the clearance between the points to compensate for the concave wear of the grounded point. The point clearance should be set not closer than .025".

Carburetor Air Valve Adjustment.—The carburetor air valve must be properly adjusted and in good condition in order to obtain good engine performance at idling speeds. If the air valve adjustment is too tight the motor will Roll; if adjustment is too loose or if the air valve spring has been stretched, the motor will Hunt; that is, speed up and slow down and occasionally spit back through the carburetor.

If a satisfactory adjustment cannot be obtained within the range of travel of the adjusting screw, while the engine is hot, let the engine cool to room temperature and check the adjustment of the thermostat on the choke lever shaft. The air valve should stand open 1/16" to 3/32" for a .050" thermostat when the choke lever is held against the stop, and 1/32" to 1/16" for the .080" thermostat. This adjustment must be made at room temperature.

Carburetor Air Valve Seat.—The carburetor air valve seat must be in good condition; if the seat leather is worn or leaky, replace with a new one.

Carburetor Air Valve Thermostat.—Beginning with Cadillac 353 and LaSalle 340 cars, the air valve thermostat arm was made thinner—.050" instead of .080" as on the earlier models.

An air valve adjustment should not be attempted until the motor is thoroughly warmed up and the adjustment should be made outside.

If air valve adjustment will not remain constant, that is, if the car owner comes back within two or three days and the air valve adjustment has changed in service, inspect the air valve thermostat and if a .050" thermostat is found, replace with an .080" unit.

Popping Back

Cadillac 353 and LaSalle 340.—Popping back may be caused by either improper adjustment of air valve or worn main nozzle tip.

The adjustment now recommended for the carburetor is to turn the adjusting screw clockwise until the motor slows down from a rich mixture (Rolls). Then turn the screw the other way, counting the number of notches until the motor slows down (Hunts) from a lean mixture. Then turn the screw back exactly half the number of notches between the two extreme positions. This method, when properly followed, is more accurate than the method generally used of testing by touching the counterweight on the air valve.

Carburetor Spray Nozzle.—Another cause for popping back may be a defective spray nozzle tip (P, Fig. 13).

In order for the air stream around the tip of the spray nozzle to have the proper characteristics, the spray nozzle must be perfectly square across the tip end and must not be rounded. A spray nozzle which has the edge of the tip rounded will produce a lean mixture with resulting back-firing.

In any case of "popping back" that cannot be corrected by proper adjustment of the carburetor, inspect the spray nozzle and replace it if the tip is rounded.

Low Gasoline Mileage

Carburetor Spray Nozzle.—Main spray nozzle (P, Fig. 13) having a defective or worn tip will affect the mileage. See information under the heading "Popping Back."

Carburetor Pump Thermostat.—In order to obtain maximum mileage the throttle pump thermostat must be accurately set at the correct temperature. If set at too high a temperature the thermostat will not open quick enough and too rich a mixture will result. If set at too low a temperature, theormostat will open too quick and car will not accelerate properly. See thermostat adjustment page 37.

Throttle Pump Adjusting Screw.—The throttle pump adjusting screw (S, Fig. 11) is for the purpose of lessening the effect of the throttle pump which may be desirable in hot weather when high test gasoline is used.

The normal setting of this screw is fully closed, or in all the way.

The screw should be opened only under the conditions mentioned above Ordinarily it is necessary to unscrew the adjustment only two or three turns The screw need never be opened more than 7 turns, as this will fully open the by-pass.

Motor Noise

Valve Noises.—The valve noises most commonly encountered in connection with a motor tune-up on Cadillac are given in the following paragraphs.

Clattering Noise.—A clattering noise may be caused by loose valve cover plates. A periodic vibration accompanied by oil leakage can be felt by placing the hand on the cover plate.

Another cause of clatter is weak or broken valve springs This trouble is generally indicated at high speed by a clattering noise. If a valve spring is broken the engine may misfire at low speed.

Scraping Noise.—A scrape or squeaking noise is most generally caused by the valve assembly being improperly installed or the valve spring rubbing against the valve cover plates or supports. The noise will occur in time with the valve action and will disappear when the cover plates are removed.

Rapping Noise.—This noise may be caused by the valve seat being out of line with the guide, but is most generally caused by stuck valve stem or valve tappet worn or incorrectly adjusted. The noise occurs in time with valve action.

If the noise is caused by a stuck valve stem the engine may misfire at idling or low pulling speeds.

If noise is caused by worn or incorrectly adjusted tappet, remove cover plates and examine for excessive clearance of tappets. Adjust to standard clearance and replace tappet screw if worn.

Squeaking Noise.—This noise is most generally caused by grit or dirt between the valve stem and guide. Vibration can be felt when holding the hand on valve spring with engine running.

The trouble can sometimes be eliminated by running oil through carburetor or priming cocks when engine is running.

Spark Plugs or Priming Cups.—A slapping noise most noticeable at idling speeds may be caused by loose spark plugs or priming cups.

Pump Suction Pipe.—A buzzing or vibrating noise on Model 314 may be caused by the suction line on the pump being drawn down against the oil pan. To locate, use sounding rod against oil suction pipe clamp bolt in right center side of crankcase. To correct, tighten clamp bolt or drop oil pan and install oil pipe with more rigid clamp.

Pump Cross Shaft.—A clatter in front of motor when engine is speeded up may be caused by a worn worm and cross shaft pump gears. To check, tighten pump gland; if noise is subdued or ceases, the trouble will be found to be worn gears.

Loose Cylinder Blocks.—On Cadillacs 314, 341 and 353 and LaSalle 328 and 340 a noise similar to loose main bearings may be caused by loose cylinder blocks.

Distributor Thrust Bearing.—A chattering noise may be caused by dry thrust washers at the bottom of the distributor shaft. To correct, lift out distributor and lubricate.

Carburetor Heat Control Valve.—A light rattling noise on Models 340 LaSalle and 353 Cadillac may be caused by worn or loose heat control valve bearings. This valve is automatic on these models.

Lack of Speed

Contact Point Setting.—For extreme high speed driving the best results will be obtained if the breaker contacts are set at 018".

OIL PRESSURE

Model and Year	Min	Max
CADILLAC		
V-63—1924-25	5 lbs	60 lbs
314—1926-27	5 lbs.	60 lbs
341A—1928	35 lbs at 30 M.P H	
341B—1929	35 lbs at 30 M P H	
353—1930	10 lbs at idle	
V-16—1930	10 lbs. at idle	
LA SALLE		
303—1927	5 lbs to 10 lbs at idle speed	
328—1928	5 lbs to 10 lbs at idle speed	
340—1929-30	5 lbs to 10 lbs at idle speed	

IGNITION TIMING

Cadillac Model V-63—1924-25.—The distributor is provided with double distributor arms which operate on an eight lobe cam. Before the ignition can be timed to the motor the points must be adjusted so that they break contact simultaneously. Adjust the points so that the gap of each pair is 018" when the arm is at the maximum opening. Time the motor so that the points just break contact when the No 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark IG-A-1-5 registers with the indicator in the flywheel housing, spark control in the full advance position The distributor rotor should be under the terminal contact for the wire leading to No. 1 spark plug.

Cadillac Models 314A, 314B—1926-27-30 341—1928, 341B—1929, 353—1929, and LaSalle 303, 328 and 340—1928-29-30.—The distributor is provided with double breaker arms which operate on a four lobe cam. The set of contact points which are in the fixed position furnish ignition for the odd numbered cylinders while the points that are adjustable for position supply the ignition for the even numbered cylinders. Time the motor for No. 1 cylinder by the points in the fixed position.

To time the motor, set the hand control in the full advanced position, crank the engine until the

Ignition Timing Table

The following table contains complete ignition timing data for Cadillac and LaSalle. To time 4-lobe cam distributors see synchronizing information below:

Year	Model	Con Pt Clear	IGNITION TIMING Fly-Wheel Travel	Piston Travel	Dead Center Position	Spark Lever Position	Plug Gap	Firing Order
CADILLAC								
1924-25	V-63	018"	*TDC			Ret	023"	See Figure 1 for firing order on all models of Cadillac
1926-27	314	025" 027"	*TDC			Ret	025" 028"	
1928	341-A	025" 027"	*⅞"		BTDC	Adv	025" 028"	
1929	341-B	025" 027"	*⅞"		BTDC	Adv	025" 028"	
1929-30	353	018" 022"	*7 ⅓°		BTDC	Adv	025" 028"	
1930	V-16	014" 018"	*1¼"		BTDC	Adv	025" 028"	
LA SALLE								
1927	303	025" 027"	*⅞"		BTDC	Adv	025" 028"	See Figure 1 for firing order on all models of La Salle
1928	328	025" 027"	*⅞"		BTDC	Adv	025" 028"	
1929-30	340	018" 022"	*7 ⅓°		BTDC	Adv	025" 028"	

*Flywheels are marked for valve and ignition timing See timing procedure Cadillac Model 341-A 1928 and LaSalle Model 303 1927 with high compression head should fire ⅛" B.T.D C. with advanced spark Cadillac Model 341-B 1929 and LaSalle Model 328 1928 with high compression head should fire ⅞" B T.D C. with advanced spark. Car should be road tested for final adjustment after timing operation is complete

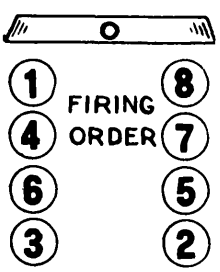


Fig. 1

Diagram showing firing order of Cadillac 8 cylinder automobiles from 1925 to 1930 inclusive The motor fires in the order of the numbers No. 1 cylinder is the first cylinder on the left side next to the radiator. No. 8 cylinder is the first cylinder on the right side next to the radiator

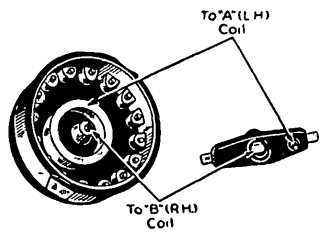
No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark IG-A-1-5 registers with the indicator in the flywheel housing. Set the distributor so that the fixed points are just breaking contact and the rotor registers with the terminal of the wire leading to the No. 1 spark plug.

Note: The marks stamped on the LaSalle flywheel are the same as those on the 314 Cadillac except that the IG-A marks are ⅞" instead of 1 3/16" ahead of center. The first cars shipped had the IG-A marks 1 3/16" ahead of dead center Should one of these flywheels be removed the marks should be changed to ⅞" ahead of dead center.

To Synchronize Breaker Arm on Distributors With 4 Lobe Cam.—One set of contact points is stationary and the other set is movable. The stationary set is adjusted first and synchronizing is completed by adjustment of the movable set of points. First adjust the gap of both sets of points to their proper clearance, (see table above for point gap) and set the spark control in full advance position. Crank the motor until No. 1 piston is approaching the T.D.C. of the compression stroke of the piston and the flywheel mark IG-A-1-5 appears at register with the indicator in the flywheel housing. Set the cam of the distributor in such position that the fixed set of points just break contact and the rotor is under the terminal of the wire leading to No. 1 spark plug. Lock the cam in this position. Again crank the engine slowly (¼ revolution) until the flywheel mark IG-A-2-6 registers exactly with the indicator and adjust the movable set of points so that they just break contact. Recheck the timing of both sets of points with their respective flywheel marks.

Fig. 2

Rotor and distributor of Cadillac V-16. The two separate high tension circuits are distributed through a special double rotor. The center brush (B) of the distributor receives current from the right hand ignition coil, the contact ring (A) receives current from the left hand ignition coil.

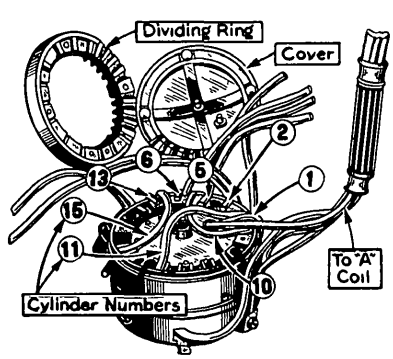


The eye cannot detect the moment the points open, and to get an accurate synchronizing adjustment, an ammeter should be connected in the ignition circuit at the distributor terminal. If on the car make sure the ignition switch is "On". The instant the ammeter needle drops back to zero, the points have opened.

Cadillac Model V-16 1930.—The distributor is provided with double breaker arms which operate on an eight lobe cam. The fixed set of points and the left hand coil, mounted in the upper tank of the radiator, furnish ignition for the left hand bank or odd numbered cylinders. The movable points and the right hand coil supply ignition to the right hand bank or even numbered cylinders. The distributor is also provided with a double end rotor (Fig. 2). The end which distributes high tension current to the right bank of cylinders is connected to a contact in the center of the rotor, which in turn is continually in contact with a brush in the center of the distributor head. The end of the rotor which provides for the left hand bank of cylinders is connected to a brush making continual contact with a ring in the distributor head. This ring is connected to a separate terminal in the head. Each spark plug wire terminal of the distributor cover is

Fig. 3

Cadillac V-16 distributor assembly. The distributor cover is marked with numbers corresponding to the number stamped below the spark plug hole for each cylinder. The spark plug wire terminal is also numbered



provided with a number cast in the bakelite to correspond to the number stamped below the spark plug hole of each cylinder. The terminal of the spark plug wire is also stamped with a number The spark plug wires should be installed so that the plug wire number corresponds with the cylinder and distributor cover numbers (see Fig. 3).

To time the ignition, crank the motor until No 1 piston is approaching T D C. of the compression stroke and the flywheel mark I G/A is under the pointer on the flywheel housing. In this position, the fixed points should just break contact and the rotor should register with the terminal of the wire leading to No 1 spark plug.

Note: There are two ignition timing marks on the flywheel, one for cylinders numbers 1 and 15, and the other for cylinders numbers 8 and 10 These marks are 1¼" before top dead center.

To Synchronize Breaker Arm on Distributors with 8 Lobe Cam (Cadillac V-16).—One set of contact points is stationary and the other set is movable. First adjust the gap of both sets of points to their proper clearance (see table above for point clearance) and set the spark control in full advance position Crank the motor until No. 1 piston is approaching T.D.C of the compression stroke and the flywheel mark 1 G/A, which is 1¼" ahead of the mark C-1-15, is under the pointer on the flywheel housing. Loosen the cam screw in top of distributor shaft and set the cam of the distributor so that the fixed set of points just break contact with the rotor under the terminal of the wire leading to No. 1 spark plug. Lock the cam in this position Again crank the motor slowly, ⅛ revolution or until the flywheel mark I G/A which is 1¼" ahead of the mark C-8-10 is under the pointer on the flywheel housing. Adjust the movable set of points so that they just break contact. Recheck the timing of both sets of points with their respective flywheel marks. A test lamp, connected in the ignition circuit at the distributor should be used for an accurate synchronizing adjustment. The instant the light goes out, the points have separated.

VALVE TIMING

Information.—Flywheel marks for checking valve timing on Cadillac and LaSalle cars are not provided, other than T.D C. marks for cylinders No 1 and No. 5 or No. 2 and No. 6. The valve timing for all practical purposes may be checked by the T D.C marks (for valve tappet settings see valve timing table below).

Cadillac Model V-63—1924-25.—To check the valve timing set the tappet clearance of the exhaust valve of No. 1 cylinder at .006". Crank the motor until the No. 1 piston is approaching T.D.C. of the exhaust stroke of the piston. When the flywheel mark 1-C-5 appears at the indicator the exhaust valve of No. 1 cylinder should just close.

Cadillac Model 314—1926-27.—Set the tappet clearance of No. 1 cylinder at .006". Crank the engine until the exhaust valve just closes. At this point the flywheel mark 1-C-5 should be directly under the indicator for Model 314—1926 and 3½° past center for Model 314—1927.

Valve Timing Table

Valve tappet clearances for Cadillac and LaSalle given in the table below are for cold setting

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh				
CADILLAC									
1924-25	V-63			.004"	.006"	*TDC		Opens	
1926-27	314			.004"	.006"	*TDC		Opens	
1928	341-A			.004"	.006"	*9½°B		Opens	
1929	341-B			.004"	.006"	*9½°B		Opens	
1929-30	353			.004"	.006"	*5°A			Closes
1930	V-16			†.030"	†.030"	TDC.		Opens	
LA SALLE									
1927	303			.004"	.006"	*9½°B	.	Opens	
1928	328		..	.004"	.006"	*9½B		Opens	
1929-30	340	.	..	.004"	.006'	*5°A			Closes

A —After top dead center B —Before top dead center
*Flywheel marks are provided for valve timing on all models except Model 353 Cadillac and Model 340 La Salle On these two models, the exhaust valve closes at 5° after top center which is very near the dead center mark
†See tappet adjustment information under valve timing procedure for correct method of adjustment

Cadillac Model 341—1928, 341B—1929.—Set the tappet clearance of the exhaust valve of No. 1 cylinder at .006". Crank the engine until the exhaust valve just closes. At this point the flywheel mark 1-C-5 should be 7° past the indicator for Model 341—1928 and 5° past the indicator for Model 341B—1929.

Cadillac Model 353—1920-30.—Set the tappet clearance of the exhaust valve of No. 1 cylinder at .006". Crank the motor until the exhaust valve just closes. At this point the flywheel mark 1-C-5 should be 5° past the indicator in the flywheel housing.

LaSalle 303 and 328 1928-29.—Valve timing procedure for LaSalle is the same as that for Cadillac 341A and B 1928-29 (see valve clearance table above).

LaSalle 340 1929-30.—The valve timing is the same as Cadillac 353 1930.

Cadillac Model V-16 1930.—Before checking the valve timing the tappet clearance should be correctly adjusted. This adjustment may be made either with the motor running or stopped. If the engine is stopped, the piston must be at the firing point for each cylinder while the tappet adjustment for that cylinder is made. The silencer plunger (Fig. 4) must be held down to the limit of its travel and the eccentric must be turned so that the cam rests on the plunger while it is in this position The adjusting screw in the rocker arm should be set to allow .030" clearance between the rocker arm and the valve stem.

If the engine is running, it is only necessary to hold the plunger down and check the clearance

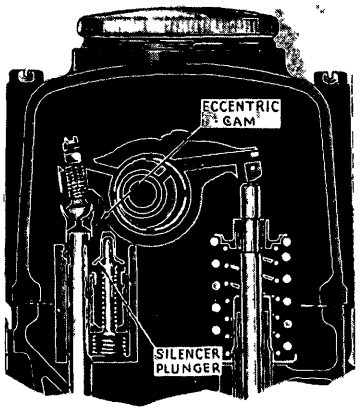


Fig. 4

Cross section view of valve rocker arm assembly used on Cadillac V-16 The tappet clearance should be set at 030" with the silencer plunger held down to the limit of its travel and eccentric cam resting against the plunger.

with a feeler. The adjustment should be changed if necessary.

To time the valves crank the motor until the intake valve for No. 1 cylinder just starts to open. At this point No. 1 piston should be at top dead center and the flywheel mark C-1-15 should be directly under the pointer on the flywheel housing.

TIMING CHAIN ADJUSTMENT

There is no manual timing chain adjustment on any model of Cadillac from 1924 to date. The only possible chain adjustment would be that of the generator and water pump drive which would have no effect on the ignition or valve timing.

FUEL SYSTEM

Pressure Relief Valve

A pressure relief valve is connected in the air line of the gasoline system on early models equipped with pressure pump for the purpose of preventing excessive pressure in the fuel system. It is attached to the left-hand side of the frame under the front floor boards and is adjusted to release if a pressure of 2½ pounds should be reached. As the pump at the front of the engine is designed to furnish a pressure of considerably less than 2½ pounds, it is evident that the relief valve is not intended to release under normal conditions. The relief valve is intended to operate only in case higher pressures result from the use of gasoline, such as "casing-head" gasoline, containing highly evaporative fractions.

If the pressure gauge on the instrument board shows a pressure of more than 2½ pounds the relief valve should be readjusted. Or, if it is found impossible to maintain sufficient pressure to insure flow of fuel to the carburetor, this condition may indicate need for readjustment of the valve.

As low pressure may also be caused by leakage of air at the gasoline tank filler cap or at the piping connections, or by the presence of dirt on the needle valve (D, Fig. 5) or its seat, do not readjust the relief valve without making certain that the low pressure is due to the valve releasing and not to these other causes.

To adjust the pressure relief valve, loosen the hexagonal gland nut (C). Then turn the hollow, slotted screw (B) in the clockwise direction if the pressure at which the valve releases is too low; or in the anti-clockwise direction if the valve releases at too high a pressure. Tighten the gland nut (C).

GAS LINE SCREENS

Model V-63—1925, 314—1926-27.—The gasoline system is protected by a settling chamber at the bottom of the gasoline tank, a strainer and a settling chamber under the front floor boards, and a strainer at the carburetor. These settling chambers and strainers must be clean. (See information below.)

Strainer at Carburetor.—A strainer is attached to the carburetor at the point where the gasoline enters. This strainer consists of three gauze discs which can be removed for cleaning after removing the six screws that hold the cover. Before doing this the air pressure should be relieved by removing the gasoline tank filler cap.

When installing the strainer, the two fine mesh screens should be put in place first with the rolled edges outward. The coarse screen is the last to go in and should have the rolled edge toward the other discs.

Strainer and Settling Chamber on Frame.—Before approximately engine number 118000 there is also a settling chamber and strainer in the gasoline line. This is attached to the left-hand side bar of the frame under the front floor boards.

To clean this strainer, first relieve the air pressure at the tank and then unscrew the drain plug. The strainer screen which is attached to the drain plug may be cleaned by washing it in clean gasoline.

Cadillac 341A, 341B—1928-29, 353—1929-30 LaSalle 328—1928, 340—1929-30 are equipped with vacuum tank feed. Two gas line strainers are provided—one located at the top, Fig. 6, of the vacuum tank and the other a gasoline filter located in the gasoline line between the vacuum tank and the carburetor. This filter has a glass bowl through which the accumulation of water and sediment can be easily seen. The bowl should be removed and the gauze screen should be cleaned, as soon as any accumulation appears in the bowl. This can be done as follows:

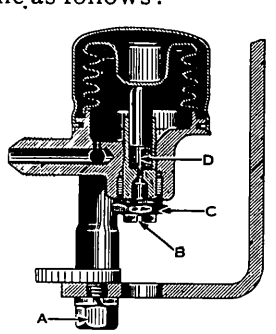


Fig. 5

Cross section air pressure release valve. (A) Cap screw holding release valve in place. (B) Valve adjustment screw. (C) Hexagon gland nut. (D) Needle valve.

First shut off the gasoline by turning clockwise the small T-handle valve at the side of the filter. Then unscrew the thumb screw under the bowl, after which the yoke supporting the bowl can be

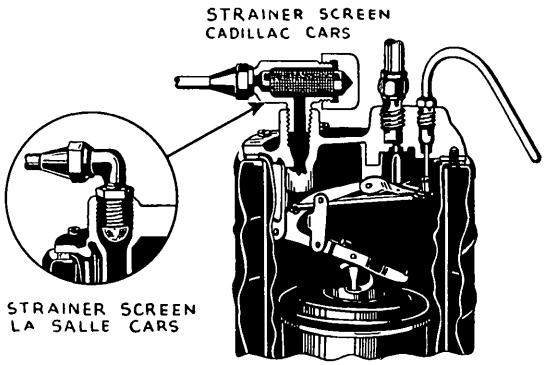


Fig 6

Cross section view of upper half of vacuum tank with insert showing location of gas line screens for both Cadillac and La Salle cars.

On late models, a thumbscrew is provided for removing the screens.

swung to one side and the bowl can be removed. If the screen does not come off with the bowl, it can be removed by pulling it straight down.

In putting back the bowl, make sure that it seats properly against the cork gasket in the top of the filter before tightening the thumb screw. Do not forget to turn the gasoline on by turning the valve anti-clockwise as far as it will go.

Cadillac V-16 1930.—Except for the gas tank at the rear of the car there are two separate gasoline systems. Each system has its own feed line, vacuum tank, strainers and carburetor. The vacuum tank covers are held in place by a knurled nut on the hollow stud which, together with a hole in the side of the nut, provides a vent for the tank. This vent must always be kept open. The vacuum fuel feed is taken care of by the vacuum pump only.

A gasoline filter located at the bottom of the vacuum tank has a glass bowl through which the accumulation of water and sediment can easily be seen. The bowl should be removed and the gauze screen should be cleaned when any foreign substance appears in the bowl. To remove the bowl, shut off the gasoline and unscrew the thumb screw under the bowl, after which the yoke supporting the bowl can be swung to one side and the screen and bowl can be removed. When reassembling, be sure that the cork gasket is seated properly in the top of the filter and that the bowl seats firmly to the gasket.

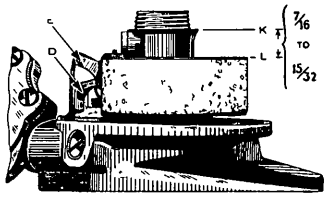
Carburetor Specifications

FLOAT ADJUSTMENT

Cadillac and LaSalle all models 1925-30 and V-16 1930.—After removing the carburetor remove the carburetor bowl, invert the carburetor and remove the small cork gasket against which the carburetor bowl presses. Take a measurement from the flange (K, Fig. 7) to the edge of the float

Fig. 7

View showing float setting for all models of Cadillac and La Salle automobiles. Adjustment should be made with carburetor upside down.



(L) at a point diametrically opposite the needle valve. This measurement should be from 7/16″ to 15/32″. Correction of the float level may be made by springing the hinge bracket slightly.

CARBURETOR SPECIFICATIONS

The following table contains the correct carburetor adjustment settings for all models of Cadillac and La Salle cars from 1925 to 1930. This table should be referred to when making carburetor adjustments.

Car and Year	Clearance between throttle disc and carb. body	End play in throttle shaft	Carb. size	Nozzle size	Throttle pump adj. screw open	THERMOSTAT			VACUUM PUMP		
						Air valve Adjustment	Thr. pump control	Vent control		Clear. between con. rod and crank journal on camshaft	Clearance between piston and cylinder
							Closes / Opens	Closes / Opens			
CADILLAC	Min. Max.	Min. Max.								Min. Max.	Min. Max.
V-63-1925	003″-.005″	015″-.005″	2″		7 turns	1/16″-1/8″ open at 65°-85° F	75° F.	77° F	*130° F	*135° F	
314-1926-27	003″-.005″	015″-.005″	2″		7 turns	1/64″-1/32″ open at 65°-85° F.	74° F	78° F.	*125° F	*130° F	
341A-1928	003″-.005″	015″-.005″	2″	No. 16	7 turns	1/64″-1/32″ open at 65°-85° F.	74° F.	78° F	*125° F	*130° F.	.001″-.003″ to .005″	.001″-.015″ to .005″
341B-1929	.003″-.005″	015″-.005″	2″	No. 16	7 turns	1/64″-1/32″ open at 65°-85° F.	74° F.	78° F.	*125° F.	*130° F	.001″-.003″ to .005″	.001″-.015″ to .005″
353-1929-30	.003″-.005″	.015″-.005″	2″		7 turns	1/64″-1/32″ open at 65°-85° F.	74° F.	78° F.	*125° F.	*130° F.	.001″-.003″ to .005″	.001″-.015″ to .005″
LA SALLE											
303-1927	.003″-.005″	015″-.005″	2″	No 16	7 turns	1/64″-1/32″ open at 65°-85° F.	74° F.	78° F.	*125° F.	*130° F.	.001″-.003″ to .005″	.001″-.015″ to .005″
328-1928	003″-.005″	.015″-.005″	2″	No. 16	7 turns	1/64″-1/32″ open at 65°-85° F.	74° F.	78° F.	*125° F.	*130° F.	.001″-.003″ to .005″	.001″-.015″ to .005″
340-1929-30	003″-.005″	015″-.005″	2″		7 turns	1/16″-1/32″ open at 65°-85° F.	74° F.	78° F.	*125° F	*130° F	.001″-.003″ to .005″	.001″-.015″ to .005″

*If very high test gasoline is used during extremely hot summer weather it may be found desirable to change this setting to have the vent closed at 115° F. and open at 120° F.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make and size of carburetor.

Car and year	Model	Engine	No. cyl	Bore and stroke	Carb. model and size
CADILLAC					OWN
1925	V-63	Own	8	3 1/8" x5 1/8"	2"
1926-27	314	Own	8	3 1/8" x5 1/8"	2"
1928	341A	Own	8	3 1/8" x4 11/16"	2"
1929	341B	Own	8	3 1/8" x4 11/16"	2"
1929-30	353	Own	8	3 3/8" x4 11/16"	2"
LA SALLE					
1927	303	Own	8	3 1/8" x4 11/16"	2"
1928	328	Own	8	3 1/8" x4 11/16"	2"
1929-30	340	Own	8	3 1/16" x4 11/16"	2"

Information.—The carburetor adjustment procedure is practically the same for all models of Cadillac and LaSalle from 1925 to 1930 inclusive and Cadillac V-16 1930. The early models used a pressure pump to force the gasoline to the carburetor while the later models have a vacuum tank fuel feed. The table of carburetor specifications given on page 34, contains adjustment data and specifications for all models The general procedure for adjusting all carburetor units is given in the following paragraphs and applies to all models of Cadillac and LaSalle cars.

Special adjustment data for Cadillac V-16 will be found on page 38.

Adjustment of Throttle Stop Screw.—In adjusting the carburetor select a quiet place, for correct adjustment depends largely upon being able to detect slight changes in engine speed.

The average idling speed of the engine under normal conditions should be about 300 revolutions per minute. If the engine runs slower or faster than this, loosen the set screw in the collar on the control rod running from the steering gear to the yoke on the accelerator pedal. Then adjust the stop screw (D, Fig. 8) on the carburetor until the engine speed is approximately 300 revolutions per minute When the throttle stop screw has been correctly adjusted, make sure that the throttle control lever is in the closed position and then set the collar on the control rod 1/32" from the yoke on the accelerator pedal.

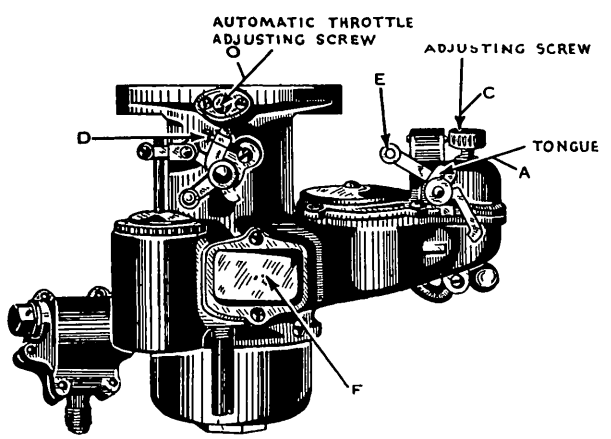


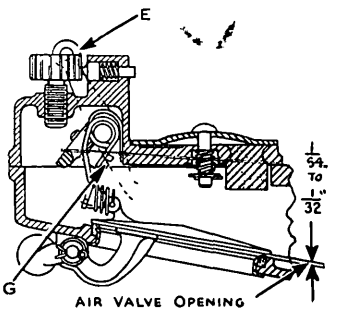
Fig 8

View of carburetor used on Cadillac showing thermostat adjusting screw (C) automatic throttle adjusting screw (O) and throttle stop screw (D)

It is important that the tongue (A) have the correct amount of clearance on each side when choke rod is pushed in flush with dash, otherwise the mixture will be rich all the time

Fig 9

Cross section view showing correct air valve opening for Cadillac Model 314 (see table carburetor specifications for setting other models) When making this adjustment the carburetor must be fully choked with lever (E) against the stop, the air valve opening can be changed by means of screw (G)



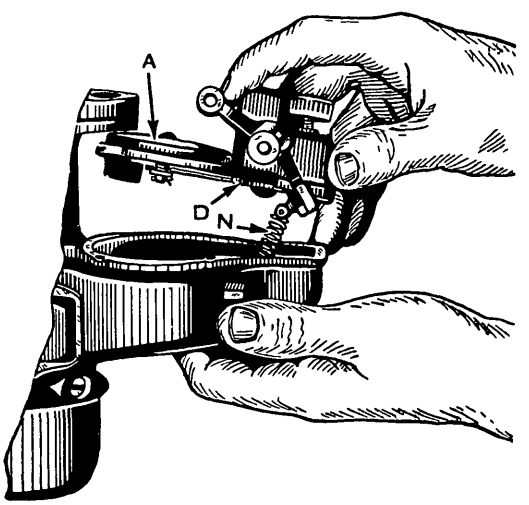


Fig 10

Showing method of removing auxiliary air valve. This operation should be done with extreme care to avoid stretching the spring (N).

Adjustment of Enriching Device.—Adjustment of the enriching device can be made only when the engine is not running. When the lever (E, Fig. 8) is held forward against the stop on the carburetor body, the tip of the air valve (Fig. 9) should, at a room temperature of *65° to 85° F., have an opening of *1/64" to 1/32" for Model 314 (see table on page 34 of this section for setting of other models) when held up lightly. In making this test do not apply enough pressure to the valve to spring the thermostatic member to which the rear end of the air valve spring is attached and against which the valve strikes when the lever is held forward.

If the opening under these conditions is more or less than the limits given, a readjustment may be made after removing the cover (A, Fig. 10), and loosening the two screws which hold the bracket carrying the thermostatic member. Tighten the screws after completing the adjustment.

Caution.—Care must be used in removing the cover (A, Fig. 10) over the auxiliary air valve not to ruin the air valve spring by stretching or twist-

*The carburetor settings given in this section are for Cadillac 314; for other models substitute settings given in table of carburetor specifications, page 34

ing it. Remove the spring after lifting the cover just enough to permit doing so. If the spring is deformed by careless removal of the cover, do not attempt to repair it, but replace it with a new spring.

The tongue (A, Fig. 8) should stand in the center of the slot in the lever (E) when the carburetor enriching button on the instrument board is forward as far as it goes. If the tongue does not stand in the center of the slot, a readjustment should be made by altering the length of the control rod attached to the lever (E).

Adjustment of Auxiliary Air Valve Spring.—The rear end of the auxiliary air valve spring is attached to a thermostatic member which automatically adjusts the spring to compensate for changes in temperature. The auxiliary air valve spring, therefore, very rarely requires readjustment.

Before attempting to adjust the auxiliary air valve spring, make certain that the enriching device is in correct adjustment and that the relief valve over the air valve seats properly.

The adjustment of the auxiliary air valve spring is made by the adjusting screw (C, Fig. 8). To determine whether the spring requires readjustment and to make the readjustment, proceed as follows:

Start the engine and run it until the intake manifold is up to normal driving temperature. Place the spark lever in the fully retarded position and move the throttle lever to the closed position. The engine speed should then be about 300 revolutions per minute. If it is necessary to adjust the throttle stop screw, proceed as described above.

After these preliminaries, make the following test to determine the necessity for adjusting the auxiliary air valve spring.

Press down gently on the ball-shaped counterweight of the auxiliary air valve and note whether the immediate result is an increase or a decrease in engine speed. Release the counterweight and allow the engine to run a few seconds to regain its normal speed. Then press up gently on the counterweight and note the effect on the engine speed.

If the mixture is correct, the immediate result of gentle pressure either up or down on the counterweight of the auxiliary air valve will be a slight decrease in engine speed. If the immediate result of gentle upward pressure on the counterweight is a slight decrease in engine speed, while the result of downward pressure is an increase in engine speed, a rich mixture is indicated. If the immediate result of upward pressure is in an increase of engine speed, a lean mixture is indicated.

If the above tests indicate an incorrect mixture adjust the auxiliary air valve screw (C, Fig. 8) by turning it clockwise to correct a lean mixture, and anti-clockwise to correct a rich mixture. Continue to change the adjustment of the screw (C) and to test as above until a correct mixture is indicated. Do not turn the screw (C) more than a few notches at a time and not more than two notches at a time when nearing correct adjustment.

Move the throttle lever to the closed position unless it is already in that position. The engine should now run at a speed of about 300 revolutions per minute. If it does not, change the adjustment of the throttle stop screw (D) until this speed is obtained. When the stop screw (D) has been adjusted correctly lock the adjustment and adjust the collar on the control rod from the steering gear so that the throttle in the carburetor will start to open immediately the throttle lever is moved. Test the correctness of the mixture as before, and if necessary readjust the screw (C). When the test indicates the correct mixture with the throttle lever at the closed position and the engine running 300 revolutions per minute, adjustment of the auxiliary air valve spring is correct. The adjustment of the enriching device should then be checked again.

Throttle Pump Adjusting Screw.—This adjustment is provided to make it possible to lessen the effect of the throttle pump which may sometimes be found desirable during warm weather, or during cold weather, if high test gasoline is used.

Unscrewing the adjusting screw (R, Fig. 11) opens a by-pass in the passage between the throttle pump and the throttle pump control thermostat.

The pressure of the air above the gasoline in the carburetor bowl is thus lessened at the moment of acceleration and less gasoline is forced through the spraying nozzle as a result.

Seven turns of the adjusting screw in an anti-clockwise direction fully opens the by-pass. The amount of opening required depends upon the quality of the gasoline and atmospheric temperature. Ordinarily it is necessary to unscrew the adjustment only two or three turns if adjustment is required.

After making the adjustment, lock it with the lock nut.

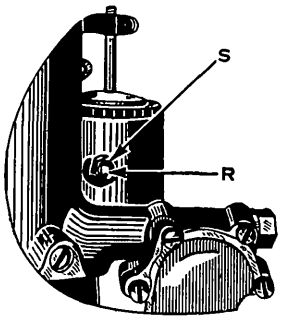


Fig. 11

View showing throttle pump adjusting screw which adjustment is provided to make it possible to lessen the effect of the throttle pump. See carburetor specifications for adjustment.

Adjustment of Automatic Throttle.—To determine if the spring which controls the automatic throttle is in proper adjustment and to make the adjustment, use carburetor tool 76037 obtainable at Cadillac service stations and proceed as follows:

Remove the carburetor from the intake header.

Attach the tool to the automatic throttle and, holding the carburetor in the horizontal position as shown in Fig. 12, note the position which the throttle disc assumes. The disc should assume the

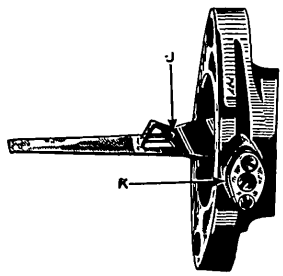


Fig. 12

View showing carburetor tool No. 76037 in position for testing spring of carburetor automatic throttle, Cadillac and La Salle cars. The weight of the tool should open the automatic throttle to within 1/32" of the stop pin.

horizontal position, the weight of the tool opening the automatic throttle to within 1/32" of the stop pin. If it does not, make sure that the throttle shaft is free in its bearings. Then slightly loosen the screws on the plate (K) and turn the slotted adjusting cap. Turning the cap clockwise increases the tension of the spring and turning it anti-clockwise decreases the tension. Tighten the screws holding the plate (K) after making the adjustment.

Carburetor Thermostats

The thermostat adjustment procedure is the same for all models of Cadillac and La Salle from 1925 to 1930 inclusive. While the thermostat settings in this section are for Cadillac 314, the table of carburetor specifications, page 34, should be consulted and correct settings substituted for other models.

Throttle Pump and Vent Control Thermostats.—When the accelerator pedal is pushed down quickly the plunger of the throttle pump forces compressed air into the carburetor bowl above the gasoline, momentarily forcing additional gasoline through the spraying nozzle.

As good acceleration is obtained with a somewhat leaner mixture after the carburetor has become warm, a thermostat is provided to open a vent hole when the temperature of the carburetor reaches a predetermined point, thus providing a release for a portion of the air compressed by the pump. The result is that less gasoline is forced through the spraying nozzle.

A second thermostat is also provided, the purpose of which is to open a large vent from the carburetor bowl during hot weather, this being desirable when very high test gasoline is used. The vent control thermostat does not open until a much higher temperature is reached than that at which the throttle pump control thermostat operates. Both thermostats are attached to the same block, the throttle pump thermostat being the inner one and the vent control thermostat the outer one.

Both thermostats are properly adjusted when the carburetor is assembled at the factory and require no further attention unless tampered with. If tampered with, thermostats may be readjusted in the following manner:

Adjustment of Throttle Pump Control Thermostat.—Remove the thermostat with block from the carburetor body, being careful not to injure the gasket. This may be done after removing the left hand screw in the face of the thermostat block. The thermostat adjustment is made by turning the screw (E, Fig. 13) which should be so adjusted that the vent hole is just closed at a temperature of *74° F. and just open at a temperature of *78° F. To test this, provide two dishes of water, one at a temperature of 74° F. and the other at a temperature of 78° F. First immerse the thermostat with block in the water at 74°. When removed, the vent hole should just be closed. If it is not, readjust the screw (E) controlling the thermostat. Then immerse it in the water at 78°. The vent hole should then be opened. If it is not, readjust the screw. When the vent hole is just closed at a temperature of 78°, the adjustment is correct and should be locked by tightening the lock nut.

Adjustment of Vent Control Thermostat.—The vent control thermostat should be adjusted in exactly the same manner as the throttle pump control thermostat, but to different temperatures.

The vent control thermostat should be so adjusted that the vent hole is closed at a temperature of *125°F. and open at a temperature of *130°F. If very high test gasoline is used during extremely hot summer weather it may be found desirable to change this setting to have the vent closed at 115° F. and open at 120° F.

In making these adjustments, care must be exercised to make certain that the water used is exactly at the temperature given. This work must be done carefully and should be entrusted only to a careful workman. The efficient operation of the carburetor depends considerably upon the skill used in making these adjustments.

If the gasket between the block and the carburetor is damaged in removal, replace it with a new one. There should be no possible chance for a leak around the vent passages.

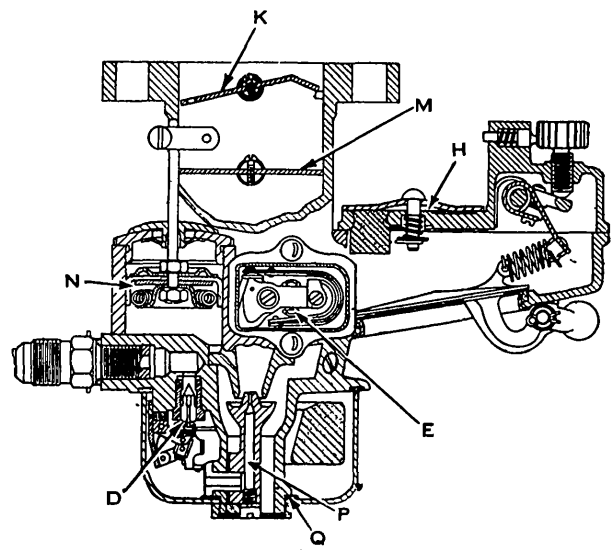


Fig. 13

Cross section view of carburetor used on Cadillac and La Salle cars. (D)Float needle valve assembly, (E) pump thermostat adjusting screw, (K) automatic throttle, (M) throttle valve, (N) throttle pump, (P) main gasoline jet.

*The carburetor settings given in this section are for Cadillac 314; for other models substitute settings given in table of carburetor specifications, page 34.

CADILLAC V-16 1930

Carburetor Adjustment.—Both carburetors must not only be carefully adjusted but must be equalized also. First check the adjustment of the choke rods to make sure that when the choke button is pulled all the way out, the levers on both carburetors are against their stops. Check the adjustment of the auxiliary air valve on each carburetor to see that the free opening of the valve is 1/16″ to 3/32″ when the carburetor is fully choked.

This must be done at room temperature. Adjust the accelerator pedal stop screw so that when the throttle levers are in wide open position, and against the stops on the carburetor, the accelerator pedal rests against the screw.

Note: This stop screw was not provided on some of the first cars and should be installed on all cars that are not provided with this stop.

Air Valves and Throttle Adjustment.—Disconnect the right hand throttle control rod and block open the air valve of the right hand carburetor. Adjust the air valve and its thermostat on the left hand carburetor in the same manner as previously described on Cadillac 314, page 35, and set the throttle stop screw so the engine will just turn over without stalling.

Then block open the air valve of the left hand carburetor and adjust the air valve and the stop screw on the right hand carburetor in a like manner.

To test, remove the block from the left hand carburetor and with the air valves and throttle stop screws on both carburetors properly adjusted, the engine should now idle at about 320 R.P.M.

To determine the correct idling speed, remove the oil filler cap from one of the valve covers and hold a finger on one of the valve rocker arms so that the movements of the rocker arm may be counted. At 320 R.P.M. the valve will open forty times in fifteen seconds.

Inasmuch as some air is drawn into the manifold of the carburetor being adjusted through the vacuum brake assister connection on the opposite intake manifold, the previous adjustment will probably be slightly rich when all cylinders are operating. To correct this condition, it may be necessary to back off each air valve adjustment about three notches. Both adjustments must be backed off exactly the same number of notches. Adjust the right hand throttle control rod very carefully so that the pin will just slip into place without affecting the throttle opening on either carburetor. The above adjustment should be checked by road test.

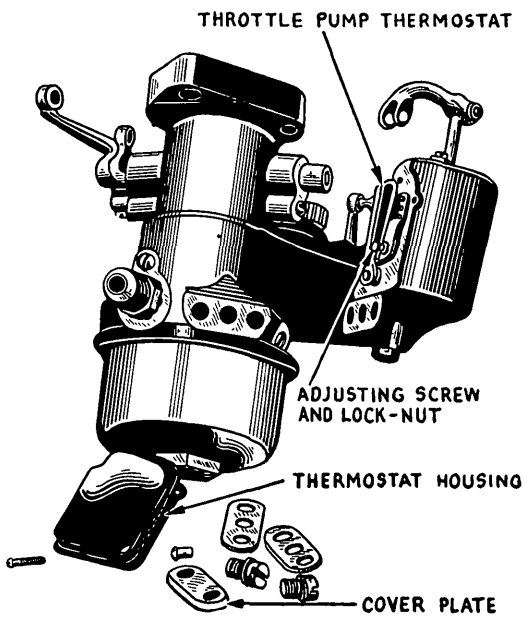


Fig. 14

View of carburetor used on Cadillac V-16 showing throttle pump thermostat, adjusting screw lock nut, thermostat housing and cover plate. The vents in the thermostat housing on the throttle pump should be kept open.

Adjustment of Throttle Pump Control Thermostat.—Remove the thermostat and pump assembly Fig. 14 from the carburetor body, being careful not to injure the gasket. The thermostat adjustment is made by turning the screw which should be so adjusted that the vent hole is just closed at a temperature of 75° F, and just open at a temperature of 80° F.

Chandler and Cleveland 1925-29

Motor Tune-up

The information included in the tune-up and timing section if observed closely, will enable a mechanic to obtain good power and performance from a Chandler motor.

Special attention should be given to timing of both valves and ignition. An accurate setting cannot be obtained unless the timing chain is properly adjusted.

Special points affecting motor tune-up will be found in the paragraphs following the tune-up operations.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain; adjust if necessary.

   Note: Timing chain adjustment should be made before checking ignition or valve timing. This is important and must be correct to obtain efficient results (see chain adjustment).
3. Adjust valve tappets.
4. Check ignition timing; adjust if necessary.
5. Check manifold gaskets; see that all manifold flange nuts are tight.
6. Clean gas line screens.
7. Check fan belt; adjust if necessary.
8. Adjust carburetor if necessary.

   Note: If correct carburetor adjustment cannot be obtained by following the adjustment instructions, see special information under carburetor (page 45) of this section.

Ragged Idle

Manifold Flange Gasket. — Carburetor and manifold flange gaskets should be tested for leaks with a gasoline squirt can if trouble is experienced at idling speeds. If leak is found, correct with new gasket or by tightening the flange nuts.

Spark Intensifiers.—In many instances where spark intensifiers are installed the motor will not idle properly, spark intensifiers should be removed.

Spark Plug Gap Setting.—The spark plug gaps should be kept within the limits given in the timing table. If the plug points are set too close the motor will not idle; on the other hand, if the gap is too wide, the motor will start hard.

Low Gasoline Mileage

Carburetor Adjustment.—With Schebler carburetors the best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. This is especially true of the idle and range adjustments and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the point where the motor smooths out from a lean mixture to a point where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Lack of Power

Timing Chains.—Lack of power may be caused by late timing as the result of a loose timing chain that has jumped a tooth. This trouble can be located by checking the timing. In the event the timing is found to be off a tooth it will be necessary to remove the radiator and timing case cover and retime the motor.

Motor Noises

Tappet Adjustment Screw.—A tapping noise in time with the valve action may be caused by a pocket worn in the head of the adjustment screw. This condition will make a correct tappet adjustment difficult. Correct with a new screw.

Rollers, Pins, Guides and Sleeves.—On older models tapping noises in time with the valve action may be caused by worn rollers, pins, guides or sleeves. Correct the trouble with new parts.

OIL PRESSURE

Model and Year	Min.	Max.
CHANDLER		
32-A, 33–1925	5 lbs.	30 lbs.
35–1926	5 lbs.	30 lbs.
31–(Standard Six) 1927	2 lbs.	10 lbs.
35–(Big Six) 1927	5 lbs.	30 lbs.
37–(Royal Straight 8) 1927	5 lbs.	20 lbs.
43–(Special Six) 1927	5 lbs.	50 lbs.
Invincible Six–1928	5 lbs.	30 lbs.
Special Six–1928	5 lbs.	30 lbs.
Big Six–1928	5 lbs.	30 lbs.
Royal Straight Eight–1928	5 lbs.	30 lbs.
65–1929	5 lbs.	30 lbs.
Big Six–1929	5 lbs.	30 lbs.
8–75–1929	5 lbs.	30 lbs.
8–85–1929	5 lbs.	30 lbs.
CLEVELAND		
31–1925	2 lbs.	10 lbs.
43–1925	5 lbs.	50 lbs.
Standard (31)–1926	2 lbs.	10 lbs.
Special (43)–1925-26	5 lbs.	5 lbs.

IGNITION TIMING

Chandler Model 32A–1925, 33–1925, 35–1926.—To time the ignition to the motor, set the spark control lever in the full advance position. Crank the motor until the No. 1 piston is approaching the T.D.C. of the compression stroke and the flywheel mark indicating top center of pistons No. 1 and No. 6 is ½ tooth before the indicator in the flywheel housing. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to No. 1 spark plug.

Ignition Timing Table

The following table contains complete ignition timing information for Chandler and Cleveland automobiles. The ignition timing is set by flywheel teeth. See timing procedure.

Year	Model	Con Pt Clear	IGNITION TIMING		Spark Lever Position	Plug Gap	Firing Order
			Fly-Wheel Travel	Dead Center Position			
CHAN	DLER						
1925	32A, 33	018"- 022"	½ tooth	B T C	Adv	025"	1-5-3-6-2-4
1926	35	018"- 022"	½ tooth	B T C	Adv	025"	1-5-3-6-2-4
1927	31 (Standard Six)	025"	2 teeth	B T C	Adv	027"	1-5-3-6-2-4
1927	35 (Big Six)	025"	½ tooth	A T C	Adv	025"	1-5-3-6-2-4
1927	Royal Str Eight	022"	1 tooth	A T C	Adv	027"	1-6-2-5-8-3-7-4
1927	43 (Special Six)	025"	D C		Adv	027"	1-5-3-6-2-4
1928	Invincible Six	025"	D C		Adv	025"	1-5-3-6-2-4
1928	Special Six	025"	2 teeth	B T C	Adv	025"	1-5-3-6-2-4
1928	Big Six	025"	½ tooth	A T C	Adv	025"	1-5-3-6-2-4
1928	Royal Str Eight	022"	1 tooth	A T C	Adv	025"	1-6-2-5-8-3-7-4
1929	65	020"- 024"	1 tooth	A T C	Adv	025"	1-5-3-6-2-4
1929	Big Six	025"	D C		Adv	025"	1-5-3-6-2-4
1929	8-75	022"- 024"	1½ teeth	B T C	Adv	025"	1-6-2-5-8-3-7-4
1929	8-85	022"	1½ teeth	B T C	Adv	025"	1-6-2-5-8-3-7-4
CLEV	ELAND						
1925	31	018"- 020"	2 teeth	B T C	Adv	025"	1-5-3-6-2-4
1925	43	018"- 020"	D C		Adv	027"	1-5-3-6-2-4
1926	Standard (31)	018"- 020"	2 teeth	B T C	Adv	027"	1-5-3-6-2-4
1925-26	Special (43)	018"- 020"	D C		Adv	027"	1-5-3-6-2-4

A.T.C —After top center B T C —Before top center. D C —Dead center. Adv.—Spark fully advanced

Chandler Model 31 (Standard Six) 1927.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark D.C. 1-6 is two flywheel teeth before the indicator of the flywheel housing. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to No. 1 spark plug.

Chandler Model 35 (Big Six) 1927.—To time the spark, set the hand control in the full advance position. Crank the motor until the No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark indicating top center of pistons No. 1 and No. 6 is ½ flywheel tooth past the indicator in the flywheel housing. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to No 1 spark plug.

Chandler Model 37 (Royal Straight 8) 1927-28.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 cylinder is approaching T.D.C. of the compression stroke and the flywheel mark indicating T. C. of pistons No. 1 and No. 8 is one flywheel tooth past the indicator in the flywheel housing. Locate the distributor so that the fixed set of points just break contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug.

Synchronizing Four Lobe Cam Distributors.—This type distributor has a four lobe cam and a double set of breaker arms. One set of arms is in a fixed position, the other set is mounted on a movable base, the position of which may be altered in relation to the cam, making it possible to accurately set the time of breaking contact. The fixed set of points furnish ignition for cylinders numbers 1-2-8-7, and the movable points for numbers 6-5-3-4. When synchronizing the points, first adjust the gap of each set at .022". Then crank the motor until the No. 1 piston is at T.D.C. of the compression stroke and the flywheel mark (D.C.-1-8) registers exactly with the indicator mark of the peep-hole in the flywheel housing. Locate the distributor so that the fixed set of points just break contact, and the rotor is under the terminal of the wire leading to the No. 1 spark plug. Crank the motor slowly approximately 90° or until the flywheel mark that indicates T.D.C. of piston No. 6 registers with the indicator of the flywheel housing. With the flywheel in this position, time the adjustable set of contact points so that they just begin to separate. Make this adjustment by altering the position of the movable base. Do not change the gap clearance. To accurately determine the instant the points break the primary circuit, it is recommended that an ammeter or light bulb be connected in the primary circuit, between the distributor and the switch. When using a gauge to synchronize the points, set the movable set of points so that contact is broken 45° of distributor travel from the time stationary points separate.

Chandler Model 43 (Special Six) 1927 (Invincible Six) 1928.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor to the T.D.C. of the compression stroke of the No.1 piston. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug.

Chandler (Special Six) 1928.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark D.C.-1-6 appears two flywheel teeth before the indicator in the flywheel housing. Set the distributor so that the points just break contact and the motor is under the terminal of the wire leading to the No. 1 spark plug.

Chandler (Big Six) 1928.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 piston has just passed T.D.C. of the compression stroke and the flywheel mark D.C.-1-6 is ½ of a tooth past the indicator mark in the flywheel housing. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug.

Chandler Model 65–1929.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 piston has just passed T.D.C. of the compression stroke and the flywheel mark D.C.-1-6 is one tooth past the indicator mark in the flywheel housing. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to No. 1 spark plug.

Chandler (Big Six) 1929.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 piston is coming up on the compression stroke and the flywheel mark D.C.-1-6 appears at the indicator in the flywheel housing. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to No. 1 spark plug.

Chandler Model 8–75–1929.—To time the spark to the motor set the hand spark control in the full advance position. Crank the motor until the No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark D.C 1 & 8 is 1½ teeth before the indicator in the flywheel housing. Locate the distributor so that the fixed set of distributor points is just breaking contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug. (See information, Synchronizing Four Lobe Cam Distributors page 40).

Chandler Model 8-85–1929.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until the No. 1 piston has just passed T.D.C. of the compression stroke and the flywheel mark D.C.-1-8 is 1½ teeth past the indicator of the peep-hole in the flywheel housing. Locate the distributor so that the fixed set of points just break contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug. (See information, Synchronizing Four Lobe Cam Distributors page 40).

Cleveland Model 31–1925, Standard (31)–1926.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor until No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark D.C.-1-6 is 2 flywheel teeth before the indicator of the peep-hole in the flywheel housing. Set the distributor so that the points are just breaking contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug.

Cleveland Model 43–1925, Special (43–1925-26.—To time the spark to the motor, set the hand control in the full advance position. Crank the motor to T.D.C. of the compression stroke of No. 1 piston. Set the distributor so that the points just break contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug.

Magneto Timing.—Chandler and Cleveland: If the ignition is by magneto, use the same procedures as described for battery ignition with the exception that the hand control is set in the full retard, and the points are in the wide open position on the cam. Have the distributor brush of the magneto under the terminal of the wire leading to No. 1 spark plug and the No. 1 piston in its proper firing position.

VALVE TIMING

Chandler Model 32A–1925, 33, 35–1925-26.—Set the tappet clearance of No. 1 exhaust valve at .004". Crank the engine until the exhaust valve just closes, at this point the flywheel mark D.C.-1-6 should be 6 flywheel teeth past the indicator in the flywheel housing.

Valve Timing Table

The following table contains the complete valve timing information for Chandler and Cleveland automobiles. The valve timing is set by flywheel teeth. See timing procedure.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh			
CHAN	DLER							
1925	32-A, 33		004"	004"	006"	6 teeth A		Closes
1926	35		004"	004"	006"	6 teeth A		Closes
1927	31 (Standard Six)	004"		006"	008"	1 tooth B	Opens	
1927	35 (Big Six)	004"		004"	006"	¾ tooth B	Opens	
1927	37 (Royal 8)	009"		007"	009"	D.C.	Opens	
1927	Special Six	006"		006"	008"	½ tooth B	Opens	
1928	Invincible Six	006"		006"	008"	½ tooth B	Opens	
1928	Special Six	009"		007"	009"	D.C.	Opens	
1928	Big Six	009"		007"	009"	D.C.	Opens	
1928	Royal Eight	009"		007"	009"	D.C.	Opens	
1929	65	009"		007"	009"	D.C.	Opens	
1929	Big Six	009"		007"	009"	D C.	Opens	
1929	8-75	009"		007"	009"	D C.	Opens	
1929	8-85	009"		007"	009"	D C.	Opens	
CLEV	ELAND							
1925	31	004"		006"	008"	1 tooth B	Opens	
1925	43	006"		006"	008"	½ tooth B	Opens	
1926	(Standard) 31	004"		006"	008"	1 tooth B	Opens	
1925–26	(Special) 43	006"		006"	008"	½ tooth B	Opens	

A.—After dead center position. B.—Before dead center position. D C —Dead center.

Chandler Series 31 (Standard Six)–1927.—Set the tappet clearance of the No. 1 intake valve at .004". Crank the motor until the intake valve just starts to open. At this point the flywheel mark D.C.-1-6 should be 1 flywheel tooth before the indicator in the flywheel housing.

Chandler Model 35 (Big Six) 1927-28.—Set the tappet clearance of the No. 1 intake valve at .004". Crank the motor until the intake valve just starts to open. At this point the flywheel mark D.C.-1-6 should appear ¾ of a flywheel tooth before the indicator in the flywheel housing.

Chandler (Special Six) 1927, (Invincible Six) 1928.—Set the tappet clearance of the No. 1 intake valve at .006". Crank the motor until the intake valve opens. At this point the flywheel mark D.C.-1-6 should appear ½ flywheel tooth before the indicator in the flywheel housing.

Chandler (Royal Straight 8) 1927, (Special Six) 1928, Model 65–1929, (Big Six) 1929, Model 8-75–1929, Model 8-85–1929.—Set the tappet clearance of the No. 1 cylinder intake valve at .009". Crank the motor until the intake valve just starts to open. At this point the flywheel mark D.C.-1-6 or D.C.-1-8 should register with the indicator of the peep-hole in the flywheel housing.

Cleveland Model 31–1925, Special 31–1926.—Set the tappet clearance of the No. 1 intake valve at .004". Crank the engine until the intake valve just starts to open. At this point the flywheel mark D.C.-1-6 should appear 1 flywheel tooth before the indicator in the flywheel housing.

Cleveland Model 43–1925, Special 43–1926.—Set the tappet clearance of the No. 1 intake valve at .006". Crank the engine until the intake valve just starts to open. At this point the flywheel mark D.C.-1-6 should appear ½ flywheel tooth before the indicator in the flywheel housing.

TIMING CHAIN ADJUSTMENT

All models of Chandler are provided with a manual timing chain adjustment.

Chandler Models 32A–1925, 33–1925, 35–1926, 35 (Big Six) 1927-28, Big Six–1929.—Timing chain adjustment is made by loosening the eccentric adjustment lock nut and turning the adjusting plate. To tighten chain turn the plate in a clockwise direction, when viewing from the rear.

Chandler Models 31 (Standard Six) 1927, (Royal Straight Eight) 1927-28, (Special Six) 1927, (Invincible Six) 1928, (Special Six) 1928, 65–1929, 8-75–1929, 8-85–1929.—To tighten the chain, loosen the nuts which secure the accessory drive assembly bracket or generator support to the timing chain case and swing the assembly away from the motor. With the engine running move the assembly until the chain hums, then move it toward the motor slightly until the hum ceases. Tighten the support nuts at this position.

Cleveland Models 31–1925, Special 31–1926, 43–1925, Special 43–1926.—To tighten the chain, loosen the nuts which secure the accessory drive assembly bracket or generator support to the timing chain case and swing the assembly away from the motor. With the engine running move the assembly out until the chain hums, then move it toward the motor until the humming ceases. Tighten the support nuts at this position.

GAS LINE SCREENS

All models of Chandler and Cleveland were equipped with vacuum feed and had two strainer screens in the gas line system. One strainer was located in the top of the vacuum tank (Fig. 1) and could be cleaned by disconnecting the fuel feed line from the supply tank and removing the elbow and bushing. The other strainer was located at the carburetor.

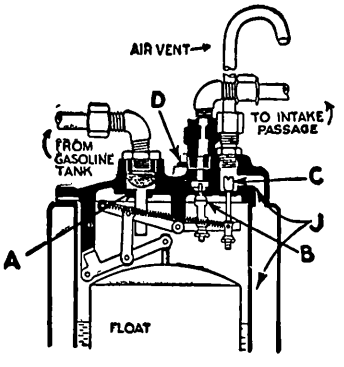


Fig. 1

Upper half of vacuum tank showing position of gas line screen. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

Gas line screens should be removed and cleaned by washing in gasoline and blowing them out with air. Clean the inside of the strainer body before replacing the screen.

Carburetor Specifications

FLOAT LEVEL

Stromberg Carburetors

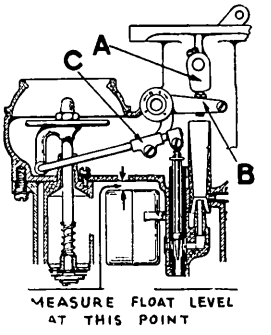
Stromberg Model OE.—The correct float level with engine running is 1" from the top surface of float chamber casting or just even with the bottom of the sight level hole which is in the side of the float chamber casting.

Schebler Carburetors

How to Adjust Float Level.—In making repairs to a Schebler carburetor, it is very important when reassembling to be sure that the proper float level is obtained. Holding the float which is assembled to the float lever, you can easily bend it up or down in order to set the float in the proper position to obtain the correct level. The float level measurement should be taken at the point between the top of the float and the carburetor body as shown in Fig. 2. See below for proper adjustment.

Fig 2

Showing points at which float level should be measured on Schebler Model S carburetors. The quickest method for checking the float level of Schebler carburetors is to see that the float lever arm stands approximately parallel with the milled flange of the carburetor body.



Schebler Carburetor Model S-1½", Die Cast.—Adjust the float 1/8" to 5/32" measuring between the float and carburetor body when float valve is seated.

Schebler Model S-1¼", Duplex.—Float level 25/64" to 27/64" measuring between the float and carburetor body when float valve is seated.

Schebler Model S-1", Stamped Bowl.—Float level 1/8" to 5/32" measuring between the float and carburetor body when the float valve is seated.

Schebler Model S-1", 1¼", 1½", Brass Bowl.—Float level with float in bowl, 5/32" from top of bowl casting to top of float when float valve is seated.

Schebler Model U-1".—With the float assembly in lower half of body, hold body upside down with float lever resting on float valve so that it is seated. Measure from the flange on lower half of body to top of float. This should measure 2". Be sure to remove the bowl gasket before taking this measurement.

Tillotson Carburetors

The float chamber cover is detachable, and when removed does not affect the float level or the needle valve and float assembly. To determine the float level remove the cover and measure from the machined top edge of the float chamber to the level of the gasoline in the bowl. Level adjustment is made by bending the float lever arm.

Tillotson Model S-2A.—The correct gasoline level is 13/16″ below the machined top edge of the float chamber when float needle valve is closed. See Fig. 6.

Tillotson Model S. P. A.—The correct gasoline level is 1″ below the machined top edge of the float chamber when the float needle valve is closed.

Tillotson Model V-3A.—The correct gasoline level is 15/16″ below the machined top edge of the float chamber when the float needle valve is closed.

Johnson Carburetors

Johnson Model H.—To determine the float level remove the float bowl and gasket. The lower face of the float must be 1″ below the surface of the carburetor diaphragm against which the float bowl gasket rests when the float valve is in the closed position. See Fig. 2A.

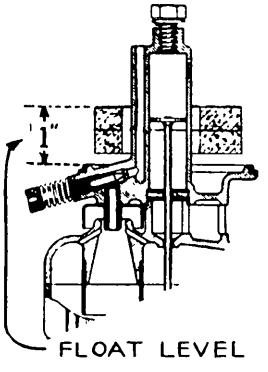


Fig. 2A

Sectional view of Johnson Model H carburetor used on Cleveland automobiles. The float encircles the lower portion from the diaphragm body and the float measurement should be taken from the lower surface of the float to the milled flange of the carburetor body as shown. To take the float measurement, hold the carburetor upside down so that the float valve will be in the closed position.

CARBURETOR SPECIFICATION DIAGNOSIS

How to Use Carburetor Specifications.—The carburetor specifications in the following section are given by carburetor model rather than by car model. To find the carburetor specifications for any particular model of Chandler or Cleveland, turn to the motor specification table under carburetor adjustment and find the correct model and size of carburetor, then locate the specifications for this particular model carburetor below.

Schebler carburetor specifications include only those parts that are most likely to be at fault if a correct carburetor adjustment cannot be obtained.

Stromberg Carburetors

Stromberg Model OE.—The following table lists the internal specifications for Stromberg Model OE carburetor as used on Chandler Series 32, 1925.

Description	Part Size
Large Venturi	1 1/16″
Main Dis. Jet	A36, B–18
Well Bleeder	Nos. 30–34
Econ. Needle	No. 60
Econ. Lift	5/16″
Accel. Nozzle	No. 54
Idle Dis. Jet	No. 52
Float Needle Seat	.113″
Idle Tube	P–8968
Straight Air Horn	P–9047
Aux. Needle Valve	P–9568
Tube Holder	P–9582
Flange Centers	2 11/16″
Size tap	⅜″–16

Schebler Carburetors

Schebler Model S-1″.—The following specifications are for Schebler Model S-1″ used on Chandler Special Six (43) 1927, Invincible Six 1928 and Cleveland Series 43 1925-26.

DESCRIPTION OF PARTS	Parts No.	Size
*Air valve spring (A Fig. 3)	48U	
†Needle valve complete (B Fig. 3)	X1712	No. 2
Needle valve seat (C Fig. 3)	S1206A	
Needle valve lift lever (D Fig. 3)	S1445	
‡Accel. pump cross passage (E Fig. 3)	S1446B	No. 56
Idle adjustment screw (A Fig. 7)	X1702	
Accel. pump cylinder (F Fig. 3)	S1450	No. 35
Float needle valve (C Fig. 3)	S1660	
Float valve seat	S1661	

* The dimensions of the air valve spring are as follows: No. of coils 10½; length 2⅝″ to 3½″; wire gauge 15.

† The needle number is indicated by the number of rings machined on the needle body as shown at B Fig. 3.

‡ Accelerating pump metering cross passages correspond to wire drill sizes (E, Fig. 3) a No. 54 passage is the same size as a No. 54 wire drill.

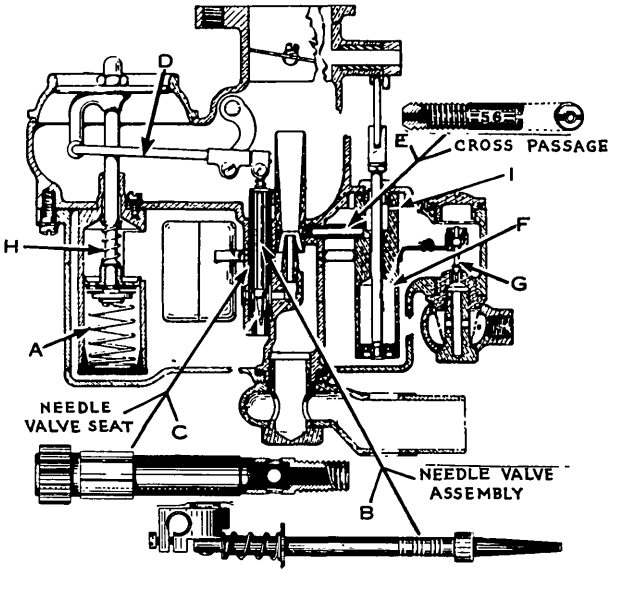


Fig. 3

Cross section view of Schebler Model S carburetor used on Chandler. (A) air valve spring; (B) needle valve complete; (C) needle valve seat; (D) needle valve lift lever; (E) accelerating pump metering or cross passage; (F) accelerating pump cylinder; (G) float needle valve assembly.

Schebler Model S-1¼".—The following specifications are for Schebler carburetor Model S-1¼" as used on Chandler Series 35 1926 and Big Six 1927-28.

Description of Part	Part No.	Size
*Air Valve Spring—A Fig. 3)	*48U	.....
†Needle Valve complete—(B Fig. 3)	X1712	No. 6
Needle Valve Seat—(C Fig. 3)	S1206A	.....
Needle Valve Lift Lever—(D Fig. 3)	S1178	.....
‡Accelerating Pump Cross Passage—(E Fig 3)	S1199A	No. 54
Idle Adjustment Screw	X1702	.....
Accelerating Pump Cylinder—(F Fig. 3)	S1198	No. 4
Float Needle Valve—(G Fig. 3)	X155	.....

* The dimensions of the air valve spring are as follows: No. of coils 10½; length 2⅝" to 3½"; wire gauge 15.

† The needle number is indicated by the number of rings machined on the needle body as shown at B, Fig. 3.

‡ Accelerating pump metering cross passages correspond to wire drill sizes (E, Fig. 3). A No. 54 passage is the same size as a No. 54 wire drill.

Schebler S-1½".—The following specifications are for Schebler Model S-1½" used on Chandler Royal Str. 8 1927-28.

Description of Part	Part No. or Size
Air Valve Spring (A, Fig. 3)	48U
Needle Valve complete (B, Fig. 3)	No. 5
Accel. Pump Cross Passage (E, Fig. 3)	No. 54
Accel. Pump Cylinder	No. 3

Tillotson Carburetors

Tillotson Model SP-20A Carburetors.—There is only one size main nozzle (C, Fig. 11) for all SP types of Tillotson carburetors. In service, mechanics who do not understand these carburetors, attempt to improve the performance by drilling out the nozzle holes. This should never be done under any consideration. The adjusting needle is for the purpose of varying the gasoline mixture and takes care of the carburetor through its complete range of adjustment.

To enable the mechanic to determine whether or not the internal carburetor specifications have been changed, complete wire drill specifications for the Model SP-20A carburetor are given in the following table.

Drill Specifications

(Tillotson Model SP-20A)

Description of Part	No. of holes	Drill size
Venturi Upper 3/32"	....	.....
Venturi Lower 5/16"	....	.....
Nozzle (Upper Holes)	2	No. 65
Nozzle (Middle Holes)	2	No. 60
Nozzle (Lower half hole)	1	No. 65
Nozzle (Lower angle hole)	1	No. 70
By-Pass (Upper supply hole)	1	No. 70
By-Pass (Lower supply hole)	1	No. 56
By-Pass Air adjusting hole	....	3/34"
By-Pass Air Bleed Hole	....	No. 65
By-Pass Fuel Restriction	....	No. 70
Fuel Adjusting Hole	....	No. 55
Inner Well Air Bleed	....	No. 36
Outer Well Air Bleed	....	No. 60

Tillotson Mod l V-3A Carburetors.—Tillotson Model V-3A carburetors are similar to the SP types with the exception of the high speed adjustment. See Fig. 12.

There is only one size main nozzle (C, Fig. 13) for all V-3A types of Tillotson carburetors. In service, mechanics who do not understand these carburetors attempt to improve the performance by drilling out the nozzle holes. This should never be done under any consideration. The adjusting needle is for the purpose of varying the gasoline mixture and takes care of the carburetor through its complete range of adjustment.

Drill Specifications

(Tillotson Model V-3A)

Description of Part	No. of holes	Drill size
Venturi—Large 1-5/32	....	.....
Venturi—Small 7/16	....	.....
Nozzle—Upper Hole	1	No. 60
Nozzle—Middle Holes	2	No. 60
Nozzle—Lower Hole	1	No. 60
By-Pass Upper Supply Hole	1	No. 70
By-Pass Lower Supply Holes	2	No. 60
By-Pass Air Adjusting Hole	....	3/32"
By-Pass Air Bleed Hole	....	No. 65
By-Pass Fuel Restriction	....	No. 68
Fuel Adjusting Hole	....	No. 52
Inner Well Air Bleed	....	No. 36
External Air Bleed	....	No. 48
Internal Air Bleed	....	No. 50
Pump Delivery Nozzle	....	No. 55
Idle Fuel Supply	....	No. 60

Carburetor Adjustment

How to Use Carburetor Adjustment Section.—The adjustment information for carburetors used on Chandler and Cleveland automobiles is given by car model. However, if it is desired to know what make and model of carburetor was used on any particular car model, refer to the motor specification table below.

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and year	Model	Engine	No. cyl.	Bore and stroke	Carb. model and size
CHANDLER					STROMBERG
1925	Series 32 & 33	Own	6	3½"x5"	OE-2-1¼"
					SCHEBLER
1926	Series 35	Own	6	3½"x5"	S-1¼"
1927	Big Six (35)	Own	6	3½"x5"	S-1¼"
1927	Spec. Six (43)	Own	6	3⅜"x4¾"	S-1"
1928	Invincible Six	Own	6	3⅛"x4¾"	S-1"
1928	Special Six	Own	6	3"x4½"	U-1"
1928	Big Six	Own	6	3½"x5"	S-1¼"
1927-28	Royal Str. Eight	Own	8	3¼"x4¾"	S-1½"
1929	8-85	Own	8	3⅜"x4¾"	S-1⅛"
1929	Big Six	Own	6	3¾"x5"	S-1⅛"
					TILLOTSON
1927	Standard Six (31)	Own	6	3"x4¼"	S-2A-1"
1929	6-65	Own	6	3⅛"x4¼"	SP-A-1⅛"
1929	8-75	Own	8		V-3A
1929	8-85	Own	8	3"x4½"	V-3-A-1 1/16"
CLEVELAND					JOHNSON
1925	Series 31	Own	6	2⅞"x4¼"	H-1"
					SCHEBLER
1925-26	Series 43	Own	6	3⅛"x4¼"	S-1"
					TILLOTSON
1926	Series 31	Own	6	3"x4¼"	S-2-A-1"

A correct carburetor adjustment is very essential to proper motor performance when tuning the motor. It is suggested that the information found under adjustment precautions be closely observed.

ADJUSTMENT PRECAUTIONS

Important Information.—If correct carburetor adjustment cannot be obtained on Schebler carburetors by following the adjustment instructions, the trouble may be due to:

1. Weak air valve spring (A, Fig. 3). This spring sometimes weakens in service, bringing about a lean mixture condition that cannot be overcome by adjustment (see carburetor specifications pages 43 and 44 for proper spring dimensions).
2. Air valve sticking caused by worn needle valve lift lever (D, Fig. 3). Replace with new lift lever.
3. Trouble obtaining correct mixture adjustment due to wrong needle valve assembly (B, Fig. 3). If mixture is too rich try smaller needle; if too lean try larger needle. If customer complains of poor gas mileage and mixture seems to be rich, try smaller needle.
4. Wrong size cross passage (E, Fig. 3). If cross passage is too small, engine will fail to accelerate properly; if too large, will load and act sluggish.

CHANDLER SERIES 32–1925

The carburetor is a Stromberg Model OE-2. Before attempting to make an adjustment run the motor sufficiently to have it completely warmed up.

Stromberg Model OE–2″

Low Speed or Idling Adjustment.—Close idling needle, the top knurled button (A, Fig. 4) on the side of the carburetor by turning to the right until needle is on its seat, then open 7 or 8 notches. The idling needle controls the air, consequently screwing it in (to the right, or clockwise), gives a richer mixture. If, after adjusting the low speed needle, the engine idles too fast, loosen clamping screw (B) and turn the small throttle stop screw (C) to the left, or anti-clockwise, until the desired idling speed is reached. If engine idles too slowly or stops, turn the throttle screw to the right, or clockwise.

High Speed Adjustment.—Close high speed needle, the lower knurled button (D, Fig. 4) just back of the float chamber, by turning down until the needle is on its seat, then open 22 to 28 notches. The high speed needle controls the gasoline, and turning it down (to the right or clockwise) gives a leaner mixture, and turning it up gives a richer mixture.

The richer mixture gives maximum power and acceleration, but if it is desired to run more economically the carburetor can be set leaner without impairing the performance of the motor. However, the lean setting will slightly increase the time required for warming up, and if set closer than 22 notches may result in unsatisfactory performance.

When testing engine for speed or power, make adjustments on the high speed needle only.

After carburetor is properly adjusted, it should need no further attention, regardless of weather conditions.

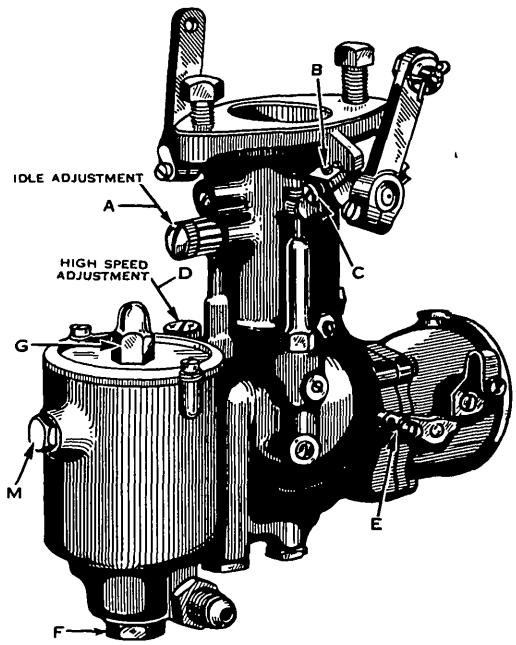


Fig. 4

View of Stromberg OE-2 carburetor used on Chandler Series 32 and 33, 1925.

Intake Manifold.—Variable heating of the intake manifold is obtained by the installation of a baffle plate extending into the exhaust manifold. The cover-plate over this baffle is marked "Winter" and "Summer". By removing four cap screws, this baffle can be changed to the winter or summer position. We suggest covering the radiator one-third to one-half during winter driving.

CHANDLER SERIES 35–1926, BIG SIX 1927-28

Schebler Model S–1¼″

Starting the Engine.—Note that the correct method of starting the Pikes Peak Motor varies from that applicable to the ordinary engine in that the spark is set in its most advanced position and the primer is to be released the instant the engine starts.

Pull out the primer and press firmly on the starting button.

During the summer time or in any moderate weather, the dash control is seldom to be pulled out beyond Notch No. 1. In cold or winter weather, pull the primer all the way out and, the instant the engine starts, push it in half way. When the motor begins to warm up and reaches a normal operating temperature, the dash control should be pushed all the way into the dash.

The Pikes Peak Motor warms up quickly and accelerates smoothly; therefore, give the motor time to warm up before the car is started.

Idle Adjustment.—Turning the idle adjustment screw (A, Fig. 5) to the right (clockwise) gives a leaner mixture. Turning it to the left (anti-clockwise) gives a richer mixture. This adjustment is not sensitive, and can be turned from three to ten notches without seriously affecting the idling of the engine.

The idle adjustment should be so set that depressing the air valve slightly (1/32 to 1/16 of an inch) will cause the engine to miss. If the mixture is too lean, the engine will stop when the air valve is depressed slightly. If the mixture is too rich, the engine will speed up slightly when you depress the air valve, which will have to be depressed considerably before the engine misses fire or dies.

If the idle adjustment is turned too far to the right, the air valve will not seat, since the needle is shut off too far. To correct this condition, turn the idle adjustment to the left until the air valve seats, and adjust as explained above.

Range Adjustment.—This adjustment is effective only in the driving range, at speeds from twenty to forty miles an hour, and it does not effect acceleration or hill climbing. The adjustment as made at the factory will usually be found the best, and it is seldom, if ever, necessary to change it. However, if an adjustment is desired, the following instructions should be followed:

Turning the range adjusting screw (B, Fig. 5) to the left gives the driving range a leaner mixture. Turning it to the right gives a richer mixture. To obtain the original factory setting, the end of the range adjustment screw (B) should be set flush with the range adjustment screw bushing (C).

If the range adjustment is changed, it is very important to readjust the idle mixture.

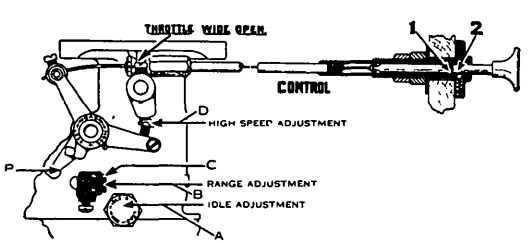


Fig. 5

Sectional view of Schebler Model S–1¼" carburetor used on Chandler Series 35 1926, Big Six 1927-28.

High Speed Adjustment.—This adjustment is effective only at wide open throttle position and, ordinarily, need not be changed. It is very sensitive to one turn in either direction. For the best results in changing this adjustment, we recommend that it be changed one complete turn in either direction and tried on a hill after each change.

The adjusting cam screw (D) is turned to the left to give a richer mixture, and to the right for a leaner mixture. With the throttle wide open, adjust the cam tappet screw (D) until there is 7/32" to ¼" space between the dash control lever (P) and the end of the range screw (B).

CHANDLER 1927, STANDARD SIX SERIES 31.

Information.—Chandler Standard Six Series 31 is the same as Cleveland Series 31–1925-26.

Tillotson Model S-2A–1"

The carburetor used is a Tillotson Model S-2A of the non-air-valve type, having two adjustments, the by-pass adjustment for idle and low speeds and the needle adjusting screw for medium and high speeds.

The idle nozzle gets its fuel from the main nozzle, therefore the main nozzle should be adjusted first.

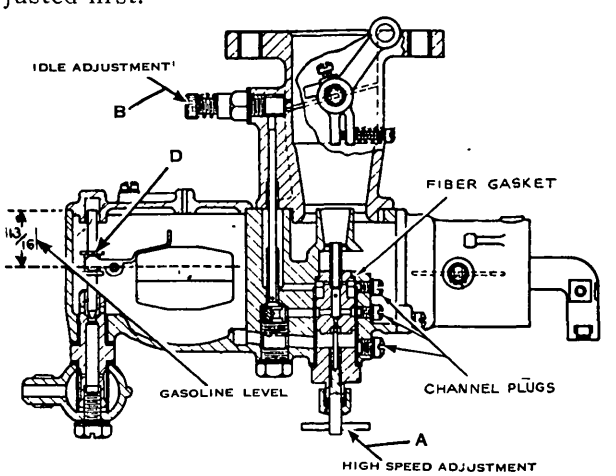


Fig. 6

Cross section view of Tillotson carburetor Model S–2A used on Chandler Standard Six Series 31 automobiles.

High Speed Adjustment.—Start motor and allow to warm up to normal driving temperature, then with advanced spark set hand throttle to give a motor speed equivalent to 25 or 30 miles per hour. Turn the needle adjusting screw (A, Fig. 6) to the right or clockwise until motor speed decreases from a lean mixture, then from this point turn the needle anti-clockwise by degrees, being careful that it is not turned back too far, or beyond the engine speed proper for that particular opening of the throttle. This will be the correct setting for the main nozzle and should be approximately one and three-quarters turns from a fully seated position. From this point, further opening of the needle will not increase the speed of the engine, and will only result in loss of fuel economy.

Low Speed Adjustment.—Close the throttle and make sure that the throttle stop screw does not allow the throttle to become fully closed. Then to get the proper idling mixture, turn the adjustment thumb screw (B) to the left or anti-clockwise admitting more air and making the mixture leaner. Continue to turn until engine flutters or misses. At this point, turn slowly in reverse direction, only

to that position where the engine again fires evenly. After the idling mixture is correct, which should be approximately one full turn from a fully seated position, adjust the throttle stop screw to the proper idling speed of the motor.

Choker.—The choker when pulled out, closes the butterfly valve in the air inlet of the carburetor, restricting the air supply and increasing the suction on the jets, thus producing a rich mixture for starting.

Do not leave the choke out or even partly out any longer than absolutely necessary, as doing so will result in excess fuel consumption and crank case dilution.

CHANDLER SPECIAL SIX (43) 1927, INVINCIBLE SIX 1928

Information.—Chandler Special Six 1928 was equipped with Schebler Model U-1" carburetor (see page 48).

Schebler Model S

There are two air inlets on the carburetor. The fixed air opening is through the venturi at the base of the carburetor and is quite small, furnishing only enough air to enable the engine to idle. The auxiliary air valve at the top of the carburetor, which is closed for idling, opens wide for full power. The auxiliary air valve is connected to the needle-valve through a proportioning lever. As the auxiliary air valve opens, the fuel needle is lifted proportionately. With this construction the flow of fuel is maintained in exactly the proper proportion to the flow of air.

Sudden enrichment of the mixture is necessary to quick engine acceleration and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is opened suddenly, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. This small amount of fuel flows through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportions for maximum power.

While driving at medium speed with the throttle partly open the mixture is regulated for maximum economy. When the throttle is open wide, the cam on the throttle shaft strikes the lever to which the choker wire is connected and gives an additional lift to the fuel needle which increases the proportion of fuel to air.

Choke.—In starting a cold engine the carburetor choker should be pulled out to the first notch (No. 2) or all the way out. This raises the position of the needle valve, and automatically supplies a very rich mixture to the engine, thus enabling the engine to start easily. The choker should be pushed in just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the choker as this is likely to cause crankcase dilution. The second notch (No. 1) should never be used unless absolutely necessary, as this position produces an exceedingly rich mixture.

Idle Adjustment.—Turning the idle adjusting screw (A, Fig. 7) to the right (clockwise) gives a leaner mixture. Turning it to the left (anti-clockwise) gives a richer mixture. This adjustment is not sensitive, and can be turned from three to ten notches without seriously affecting the idling of the engine.

The idle adjustment should be so set that depressing the air valve slightly (1/32 to 1/16 of an inch) will cause the engine to miss. If the mixture is too lean, the engine will stop when the air valve is depressed slightly. If the mixture is too rich, the engine will speed up slightly when you depress the air valve, which will have to be depressed considerably before the engine misses fire or stops.

If the idle adjustment is turned too far to the right, the air valve will not seat, since the needle is shut off too far. To correct this condition, turn the idle adjustment to the left until the air valve seats, and adjust as explained above.

Range Adjustment.—This adjustment is effective only in the driving range, at speeds from twenty to forty miles an hour, and it does not affect acceleration or hill climbing. The adjustment as made at the factory will usually be found the best, and it is seldom, if ever necessary to change it. However, if an adjustment is desired, the following instructions should be followed:

Turning the range adjusting screw (B, Fig. 7) to the left gives the driving range a leaner mixture. Turning it to the right gives a richer mixture. To

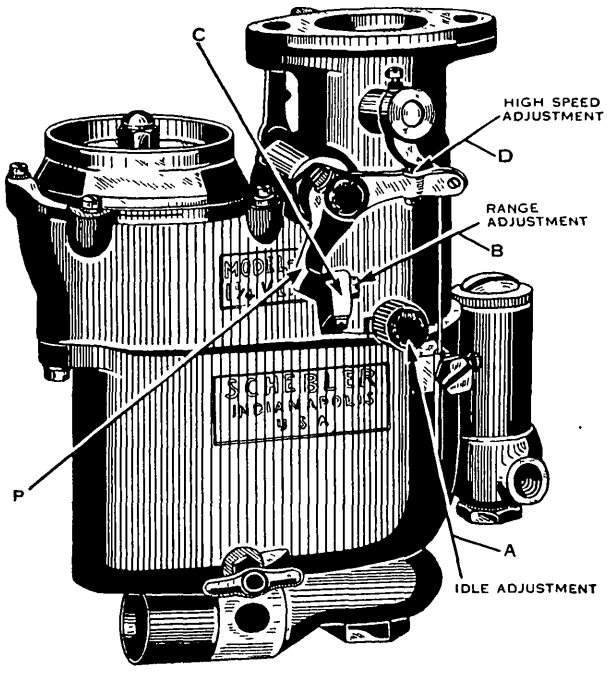


Fig. 7

View of Schebler Model S–1" carburetor as used on Chandler Special Six (43) 1927 and Invincible Six 1928.

obtain the original factory setting, the end of the range adjustment screw (B) should be set flush with the range adjustment screw bushing (C).

If the range adjustment is changed, it is very important to readjust the idle mixture.

High Speed Adjustment.—This adjustment is effective only at wide open throttle position and ordinarily need not be changed. It is very sensitive to one turn in either direction. For the best results in changing this adjustment, we recommend that it be changed one complete turn in either direction and tried on a hill after each change.

The adjusting cam screw (D, Fig. 7) is turned to the left to give a richer mixture, and to the right for a leaner mixture. With the throttle wide open, adjust the cam tappet screw (D) until there is 7/32 to ¼ inch space between the dash control lever (P) and the end of the range screw (B).

CHANDLER SPECIAL SIX 1928

Information.—Chandler Special Six (43) 1927 was equipped with Schebler Model S–1″ (see page 47).

Schebler Model U–1″

The carburetor is of the expanding type and having variable air passages while the fuel is automatically controlled in proportion.

The carburetor is designed to give maximum power and economy with present day fuel.

Sudden enrichment of the mixture is necessary to quick engine acceleration and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is opened suddenly, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. This small amount of fuel flows through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportions for maximum power.

While driving at normal speed with the throttle partly open the mixture is regulated for maximum economy .When the throttle is open wide, the carburetor delivers a mixture for maximum power.

Dash Control.—In starting a cold engine the carburetor dash control should be pulled out all the way, and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine, thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control as this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that lever (E, Fig. 8) is as far back as it will go with the control fully seated. Also see that the control tubing end is flush with clamp lug (F).

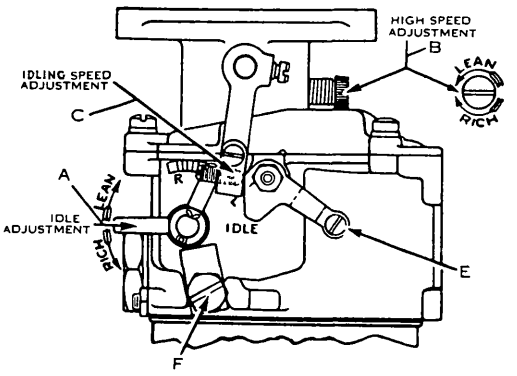


Fig. 8

Sectional view of Schebler carburetor Model U used on Chandler Special Six 1928.

Idle Adjustment.—Moving the idle adjusting lever (A, Fig. 8) upward to (L) gives a leaner mixture. Moving it downward to (R) gives a richer mixture. This adjustment is sensitive and must not be moved more than a notch at a time.

The idle adjustment should be so set that the engine almost stops when moving the lever towards (L) after which back the lever to (R) two notches which will give the correct idle adjustment.

Idle Speed Adjustment.—With dash control button fully seated, and engine idling, turn adjusting screw (C) clockwise to speed up the idle and anti-clockwise to slow up the idle.

High Speed Adjustment.—This adjustment is effective only at open throttle and ordinarily need not be changed. It is very sensitive to one turn in either direction and entirely governs fuel economy.

The high speed adjustment must be made with the engine accelerated with the throttle lever to about twenty miles an hour. With the engine turning steadily at this speed, turn the adjusting screw (B, Fig. 8) lean until the engine slows to a point of almost stopping, then turn the screw (B) to rich (three quarters of a turn) which will give the correct adjustment.

To obtain an approximate adjustment with which to start, turn screw (B) in all the way rich and back it out one and one-half turns. With the adjustment screw turned in all the way rich, the carburetor will not give an exceedingly rich mixture.

After making the high speed adjustment, it may be necessary to change slightly the idle adjustment (A).

CHANDLER ROYAL STRAIGHT EIGHT 1927-28, 8-85–1929 and BIG SIX–1929

The adjustment procedure for Chandler Big Six 1928 is the same as that for the 1929 models (both 6's and 8's) with the exception that models using 1½″ or larger carburetors are equipped with a decelerating device.

Note: Chandler 8–75 and 8–85 1929 came equipped with both Schebler and Tillotson carburetors; for information on Tillotson carburetors see page 50 of this (Chandler) section.

Schebler Model S

Accelerating Device.—Sudden enrichment of the mixture is necessary to quick engine acceleration and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is opened suddenly, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. This small amount of fuel flows through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportions for maximum power.

While driving at normal speed with the throttle partly open the mixture is regulated for maximum economy. When the throttle is open wide, the carburetor delivers the proper mixture for maximum power.

Dash Control.—In starting a cold engine the carburetor dash control should be pulled out all the way, and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine, thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control as this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that the control lever at the carburetor is as far back as it will go with the control fully seated.

Idle Adjustment.—Turning the idle adjusting screw (G, Fig. 9) to the right (clockwise) gives a leaner mixture. Turning to the left (anti-clockwise) gives a richer mixture. This adjustment is not sensititve, and can be turned from three to ten notches without seriously affecting the idling of the engine.

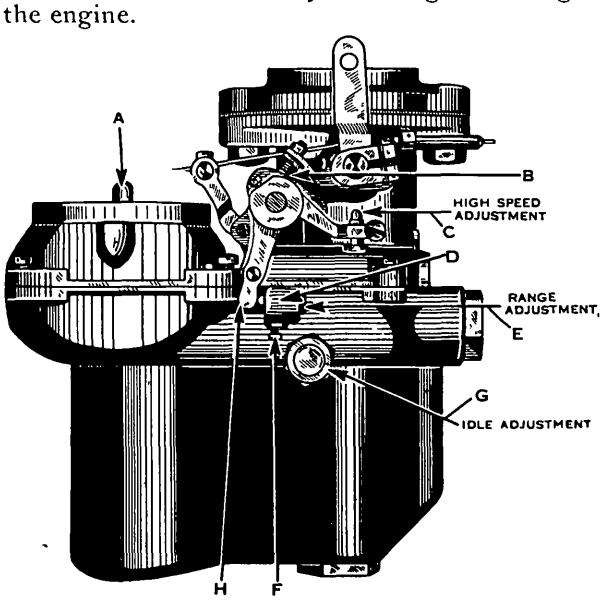


Fig. 9

View of Schebler carburetor Model S used on Chandler Royal Straight 8, 1927-28, 8-85–1929 and Big Six 1929.

The idle adjustment should be so set that depressing the air valve (A) slightly (1/32 to 1/16 of an inch) will cause the engine to miss. If the mixture is too lean, the engine will stop when the air valve is slightly depressed. If the mixture is too rich, the engine will speed up slightly when you depress the air valve, which will have to be depressed considerably before the engine misses fire or stops.

If the idle adjustment is turned too far to the right, the air valve will not seat, since the needle is shut off too far. To correct this condition turn the idle adjustment to the left until the air valve seats, and adjust as explained above. The throttle idle adjustment is made at (B).

Range Adjustment.—This adjustment is effective only in the driving range, at speeds from twenty to forty miles an hour, and it does not effect acceleration or hill climbing. The adjustment as made at the factory will usually be found the best, and it is seldom if ever necessary to change it. However, if an adjustment is desired, the following instructions should be followed:

Turning the range adjusting screw (E, Fig. 9) to the left gives the driving range a leaner mixture. Turning to the right gives a richer mixture. To obtain the original factory setting, the slotted end of the range adjustment screw (E) should be set flush with the bushing (D) and locked by screw (F).

If the range adjustment is changed, it is very important to readjust the idle mixture.

High Speed Adjustment.—This adjustment is effective only at wide open throttle position and ordinarily need not be changed. It is very sensitive to one turn in either direction. For the best results in changing this adjustment, we recommend that it be changed one complete turn in either direction and tried on a hill after each change.

The adjusting screw (C, Fig. 9) is turned to the left to give a richer mixture, and to the right for a leaner mixture. With the throttle wide open, adjust the cam tappet screw (C) until there is approximately ¼ inch clearance between the dash control lever (H) and the end of the range screw (E).

CHANDLER 6-65 1929

Tillotson Model S–PA 1 5/16″

The carburetor is of the expanding type and having variable air passages while the fuel is automatically controlled in proportion.

The carburetor is designed to give maximum power and economy with present day fuel.

Sudden enrichment of the mixture is necessary to quick engine acceleration and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is opened suddenly, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. This small amount of fuel flows through the metering nozzle leading directly into

the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportions for maximum power.

While driving at normal speed with the throttle partly open the mixture is regulated for maximum economy. When the throttle is open wide, the carburetor delivers the proper mixture for maximum power.

Dash Control.—In starting a cold engine the carburetor dash control should be pulled out all the way, and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control as this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that the choke lever is as far back as it will go with the control fully seated.

Idle Adjustment.—Turning the idle adjusting screw (A, Fig. 10) to the right (clockwise) gives a richer mixture. Turning to the left (anti-clockwise) gives a leaner mixture. This adjustment is sensitive, and must not be turned more than three notches without seriously affecting the idling of the engine.

Close the throttle and make sure that the throttle stop screw does not allow the throttle to become fully closed. Then to get the proper idling mixture, turn the adjustment thumb screw (A) anti-clockwise admitting more air and making the mixture leaner. Turning it clockwise enriches the mixture. After the idling mixture is correct, which should be approximately one full turn from a fully seated position, adjust the throttle stop screw to the proper idling speed of the engine.

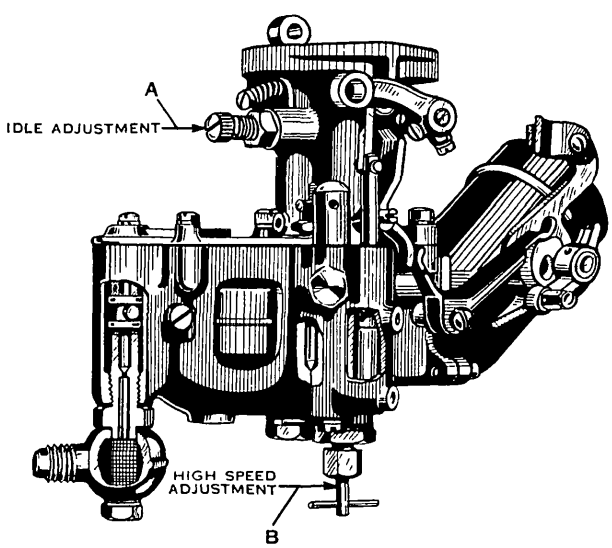


Fig. 10

Section of Tillotson carburetor Model SP–20A used on Chandler automobiles.

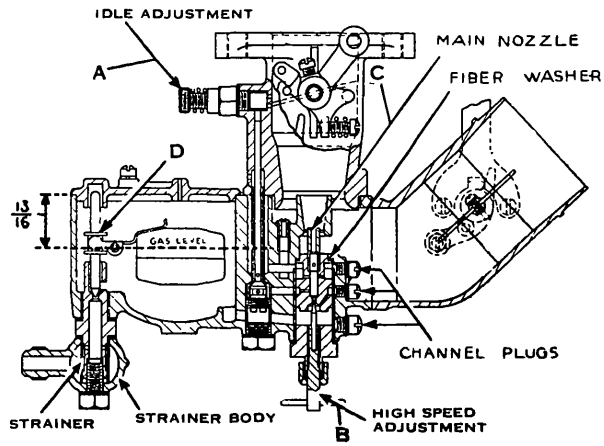


Fig. 11

Cross section view of Tillotson carburetor Model SP–20A, showing internal section of carburetor.

High Speed Adjustment.—This adjustment is effective only at wide open throttle position and ordinarily need not be changed. It is very sensitive to one turn in either direction. For the best results in changing this adjustment, we recommend that it be changed one complete turn in either direction and tried on a hill after each change.

The adjusting screw (B, Fig. 10) is turned clockwise to give a richer mixture, and anti-clockwise for a leaner mixture. With the throttle partly open, to an engine speed of approximately 25 M.P.H. allow the engine to warm up to normal driving temperature. No spark adjustment is required in this instance because of the full automatic feature incorporated. Turn the needle adjusting screw (B) anti-clockwise until motor speed decreases from a lean mixture, then from this point turn the needle clockwise by degrees, being careful that it is not turned back too far, or beyond the engine speed proper for that particular opening of the throttle. This will be the correct setting for the main nozzle and should be approximately one and three-fourths turns from a fully seated position.

CHANDLER 8-75, 8-85 1929

Note.—Chandler 8-85–1929 came equipped with both Schebler and Tillotson carburetors. For information on Schebler equipment see page 48 of this section.

Tillotson Model V-3A

The carburetor is a plain tube expanding type and having fixed air passages while the fuel is automatically controlled in proportion.

The carburetor is designed to give maximum power and economy with ordinary fuel.

Sudden enrichment of the mixture is necessary to quick engine acceleration and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is opened suddenly, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. This small amount of fuel flows

through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportions for maximum power.

While driving at normal speed with the throttle partly open the mixture is regulated for maximum economy. When the throttle is open wide, the carburetor delivers the proper mixture for maximum power.

Dash Control.—In starting a cold engine the carburetor dash control should be pulled out all the way, and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control as this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that the choke lever (E, Fig. 12) is as far back as it will go with the control fully seated.

Starting the Engine.—All carburetor adjustments are made with the engine at normal running temperature and with the spark and dash control buttons pushed in.

Also make certain that the carburetor gasket and all lock screws are tight before making adjustments.

Close main adjusting needle (B, Fig. 12) by turning to the right or up until the needle is seated (never force tightly against its seat), then open by turning to the left or down two complete turns.

Close the by-pass or low speed adjusting needle (A) until it is seated by turning to the right or in, then open by turning to the left or out one-half turn. Thus adjusted the engine should start and operate.

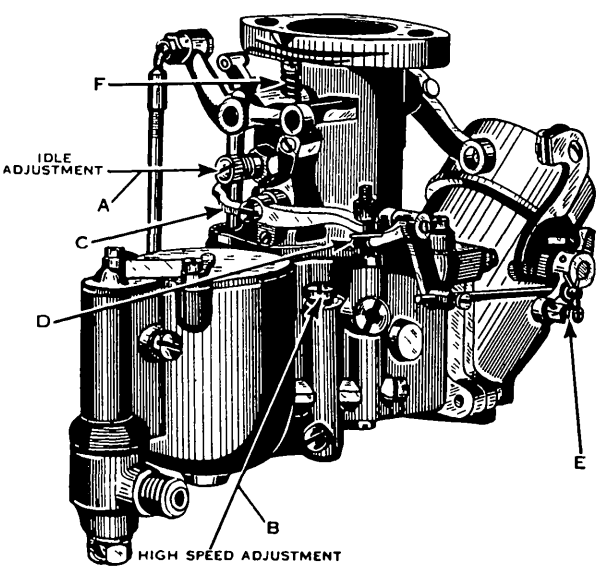


Fig. 12

View of Tillotson carburetor Model V–3A used on Chandler automobile.

Set throttle lever on steering column to operate engine at a speed equivalent to 25 miles per hour car speed (never race engine). Start engine and run until thoroughly warm.

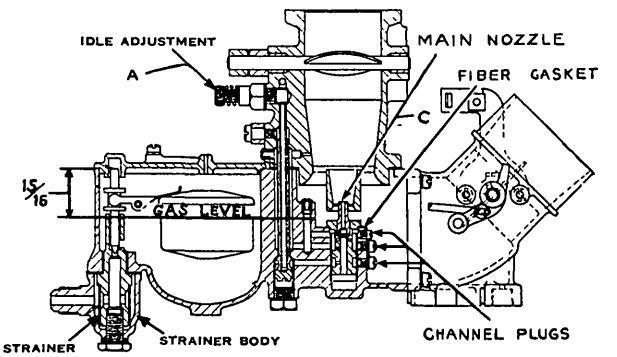


Fig. 13

Cross section view of Tillotson Model V–3A carburetor used on Chandler showing the internal construction of this type of carburetor.

Main Adjusting Needle.—Retard the spark control lever fully. With the engine running approximately 25 miles per hour car speed, gradually turn the main adjusting needle (B, Fig. 12) to the right or up to a point where the engine slows down for want of fuel. When this point is reached stop and gradually turn in the reverse direction until that position is found where the engine runs free. This adjustment should be carefully made, for gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and free running. Provision for maximum power is automatically supplied, through accelerating pump (C) and needle lift (D), so in adjusting set the main adjustment to provide for economical road performance.

Idle Adjustment.—Close the throttle fully and with the spark still retarded, set throttle lever stop screw (F) to run engine faster than is desired for normal idling speed. Now turn speed adjusting needle (A, Fig. 12) gradually to the left or out, thinning the mixture, until a noticeable flutter or missing occurs. At this point turn in the reverse direction only to that position where the engine again fires evenly. Leave this adjustment at the position delivering just as thin a mixture as will properly idle the engine. Now carefully adjust the throttle lever stop screw to operate the engine at the desired idling speed.

In operation the carburetor is fully automatic except that at partial choke positions—as controlled through the manual choke control on dash—fuel metering is governed by the usual high and low adjustment needles.

Lift Needle Setting.—If as in instances where in cleaning or at times when the carburetor is for any purpose dissembled, we call to your notice the importance of the correct setting of the lift needle (D, Fig. 12). With the throttle closed and the choke full open there should be a minimum of .030″ to .040″ play between the adjustable nut on

the needle and the fork of the lever. There should always be sufficient play between the levers coupling the choke cam and the needle lift lever to insure the seating of this needle.

CLEVELAND 1925-26

Information.—The 1925-6 models of Cleveland were equipped with three makes of carburetors—Johnson, Schebler and Tillotson. (See motor specifications in the front of this section).

Series 31 1925 (Johnson Model H).—See below for carburetor information.

Series 43–1925-26.—The motor used in this model of Cleveland was the same as that used in Chandler Model Special Six 1927. (See page 47 of this section for carburetor information).

Series 31–1926.—The motor used in this model of Cleveland was the same as that used in Chandler Standard Six (31)-1927. (See page 46 of this section for carburetor information).

CLEVELAND 31–1925

The carburetor used is a Johnson Model H of the air valve type.

The mixing chamber (A, Fig. 14) is so designed that all manifold condensation draining back from the manifold after the motor is stopped, accumulates in the cup (C) at the lower end of the strangle tube in the Primary Air Passage, to be used for enriching the mixture when again starting the motor.

A perfectly balanced fuel mixture is maintained at all speeds by the auxiliary air valve (D). The unique feature in the design of this air valve is the stabilizer (E) which consists of a plunger operating in a special chamber. The object of the stabilizer is to overcome the flutter ordinarily set up in the air valve which is promptly dissipated in overcoming the inertia of the submerged plunger.

On acceleration the mixture is momentarily enriched by means of the pump (F, shown in the insert Fig. 14) which increases the pressure in the float chamber accelerating the fuel flow from the nozzle.

Johnson Model H

Choker.—The choker when fully choked must lock the air valve shut and when entirely off the choke lever on the carburetor must be free to open its full travel and the operating button in the choke wire should have one eighth inch clearance from the choke lever in the normal running position.

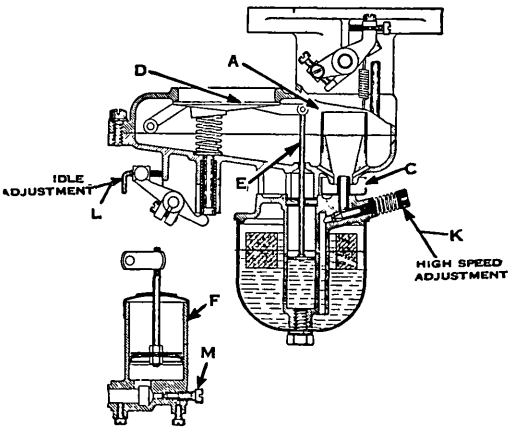


Fig. 14

Cutaway view of Johnson Model H carburetor used on Cleveland Series 31, 1925.

Low Speed Adjustment.—The idling adjustment is controlled by the adjusting screw (L, Fig. 14) in the end of the lever to which the choker wire is attached. Start motor and allow to warm up to normal driving temperature, then with advanced spark and closed throttle adjust for desired quality mixture—"Right" to make rich—"Left" to make lean.

High Speed Adjustment.—The high speed or driving adjustment is controlled by the adjusting screw (K, Fig. 14). Set hand throttle to give a motor speed equivalent to 20 to 25 miles per hour. Turn needle (K) clockwise until motor speed decreases from a lean mixture, then from this point turn needle anti-clockwise approximately one quarter turn. This will be the correct setting and should be approximately one and one-quarter turns from a fully closed position.

A further check for correct mixture will show that the motor will slow down with the slightest depression of the air valve.

Accelerator Pump Adjustment.—To reduce the effect of the pump, turn screw (M) anti-clockwise and clockwise to increase the effect as it may be determined by acceleration from 5 to 25 miles per hour.

Chevrolet 1925-30

Motor Tune-Up

A complete motor tune-up includes all of the following tune-up operations.

Tune-Up Operations

1. Adjust valve tappets.
   Note: Check contact faces of rocker arms and lifters. Accurate tappet adjustment cannot be obtained if badly worn. Cupped or worn rocker arm contact face will cause knock that cannot be removed by tappet adjustment.
2. Oil rocker arm felts.
3. Check and clean distributor and spark plug points.
4. Check ignition timing and spark advance linkage.
   Note: After June 1927 all models of Chevrolet came equipped with semi-automatic spark advance (see ignition timing).
5. Check high tension wiring.
   Note: If high tension wire insulation is bloated, soft, or cracked at the point where they enter or leave the fibre bracket replace with new wires.
6. Clean carburetor and gas line screens.
   Note: For best power and economy all fixed jets should be renewed and the carburetor thoroughly cleaned every 20,000 miles.
7. Adjust carburetor idling screw and check for manifold leaks.
8. Adjust fan belt.

Ragged Idle

Low Speed Carburetor Jet.—A dirty or plugged low speed jet will cause the motor to idle poorly. To correct, clean carburetor and gas line screens.

Air Leaks.—A windshield wiper connection or manifold gasket that leaks will cause a poor idling condition. Test for air leaks with a squirt can full of gasoline.

Spark Plug Gap.—A condition of poor idling may be caused by the spark plug gaps being set too close together. The plug gap setting should not be set closer than .025″. See Ignition Timing table.

Lack of Power

Ignition Timing.—Lack of power may be caused by late ignition timing. The timing may be changed by the distributor slipping in the advance lever arm clamp. Recheck ignition timing.

Low Gasoline Mileage

Low gasoline mileage may be due to incorrect timing, dragging brakes, etc., but it is expected that the mechanic will check these points before tampering with the fuel system. If all timing adjustments are correct the following points should be checked.

Leaky Carburetor Float Valve.—Poor gasoline mileage may be caused by a leaky carburetor float valve raising the gasoline level. This condition is generally caused by a combination of a leaky float valve and fuel pump pressure. Because of the fact that the carburetor may not leak on the service floor the trouble is sometimes hard to locate.

To test turn the carburetor upside down and suck on the gasoline inlet. If the vacuum created will not hold the tongue against the inlet at three different positions of the float needle the float valve is leaky and should be replaced.

Main Well Metering Rod Bent.—Excessive wear on the metering rod and multiple jet may be caused by the metering rod being warped or bent. This condition of wear will cause a loss in gasoline mileage. The metering rod should hang free in the multiple jet.

Accelerating Pump Plunger Leaky.—A loss in gasoline mileage may be caused by a worn or leaky carburetor accelerating pump plunger leather. Air drawn in through the pump past the plunger will carry a certain amount of gasoline into the motor.

To correct this trouble replace the plunger leather and make certain that the plunger spring is in place.

High Carburetor Float Level.—Another cause of loss in gasoline mileage is high float level. This condition can be remedied by bending the float lever arm.

Motor Noises

Valve Rocker Arms Noisy.—A valve noise may be caused by a cocked rocker arm. This condition will cause the rocker arm to shift every time the valve is opened which produces a knock in time with the valve. Also another cause of knock is badly worn rocker arm or lifter faces. This condition will prevent a correct tappet adjustment and can only be corrected by truing up the contact faces or replacing the parts.

Valve Cover Drawn Too Tight.—If the valve cover is drawn down too tight the valve rocker arms may strike the cover, causing a knock in time with the valve action.

Valve Tappet Noise.—A condition may be encountered where a slight valve tappet noise will persist in spite of anything the mechanic may do.

In these cases the noise can very often be eliminated by cutting a section out of the metal windshield tube and inserting a section of rubber hose.

OIL PRESSURE

Model and Year	Min.	Max.
K—1925	2 lbs.	8 lbs.
V—1926	2 lbs.	8 lbs.
Capitol—1927	2 lbs.	15 lbs.
National—1928	2 lbs.	30 lbs.
International—1929	2 lbs.	30 lbs.
Universal Six—1930	5 lbs.	20 lbs.

IGNITION TIMING

Chevrolet Models 1925 to June, 1927 (all models without semi-automatic advance).—Crank motor until the intake valve in No. 1 cylinder opens and closes. Continue cranking until piston in No. 1 cylinder is at top dead center; set the cam in the distributor so that the points just begin to break. Spark lever fully retarded.

Chevrolet Models 1927-28 (semi-automatic spark control).—Crank the motor until both valves in No. 1 cylinder are closed. Continue cranking until the 25° mark on the flywheel is in line with the pointer. With the spark lever fully advanced rotate the distributor body anti-clockwise until breaker joints just start to open.

Chevrolet Six Cylinder 1929-30 (semi-automatic spark advance).—To time the ignition crank the motor until the No. 1 piston is coming up on the compression stroke and the 12° or 15° mark on the flywheel lines up with the indicator mark of the peek hole in the flywheel housing. With the spark control in fully advanced position, the contact points should just start to open, and the rotor register with the terminal for No. 1 spark plug wire at the distributor.

Ignition Timing Table

The following table contains complete ignition timing specifications for all models of Chevrolet from 1925 to 1930 inclusive.

Year	Model	Con Pt Clear	IGNITION TIMING			Spark Lever Position	Plug Gap	Firing Order
			Fly-Wheel Travel	Piston Travel	Dead Center Position			
1925	K	030″	T D C	T D C	T D C	Ret	025″	1-2-4-3
1926	V	030″	T D C	T D C	T D C	Ret.	030″	1-2-4-3
1927	Capitol	025″	T D C	T D C	T D C	Ret	030″	1-2-4-3
1927	Capitol	025″	25°	*T D C	B T C	Adv	030″	1-2-4-3
1928	National	025″	25°	*T D C	B T C	Adv.	.025″	1-2-4-3
1929	Internat. 6	018″ 020″	12° or 15°	*T D C	B T C	Adv	025″	1-5-3-6-2-4
1930	Universal (Ser) A D	018″ 020″	12°	*T D C	B T C	Adv	025″	1 5 3-6 2 4

B T.C —Before top center. T.D C—Top dead center. Adv —Spark lever advanced. Ret —Spark lever retarded.

* If ignition is timed by piston travel gauge set the spark to occur at top dead center with spark lever fully retarded

VALVE TIMING

Chevrolet, all models, 1925-28 (four cylinder).—Set valve tappets for No. 1 cylinder to .008″ clearance, cold; crank the motor until piston in No. 1 cylinder has traveled 1/16″ downward on its suction stroke. At this point the intake valve for No. 1 cylinder should just begin to open.

Chevrolet 6 Cylinder Models, 1929-30.—Adjust the valve tappet clearance of No. 1 cylinder to .008″. Crank the motor until the No. 1 piston has reached T.D.C. of the exhaust stroke. The intake valve should just begin to open when the U-C mark on the flywheel rim has reached a point 4 degrees past the indicator mark of the peek hole in the flywheel housing.

Valve Timing Table

The following table contains complete valve timing specifications for all models of Chevrolet from 1925 to 1930 inclusive.

Year	Model	TAPPET ADJUSTMENT				INTAKE VALVE OPENS			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Tolerance	Dead Center Position
		Int	Exh	Int	Exh				
1925	K	008″C	008″C	008″H	010″H		1/16″		A T C
1926	V	008″C	008″C	008″H	010″H		1/16″		A T C
1927	Capitol	008″C	008″C	006″H	008″H		1/16″		A T C
1928	National	008″C	008″C	006″H	008″H		1/16″		A T C
1929	Internat 6	008″C	008″C	008″H	008″H	4°	003″		A T C
1930	Universal (Series A D)	008″C	008″C	008″H	008″H	4°	003″		A T.C

A T C —After top center C —Cold setting H —Hot setting

GAS LINE SCREENS

All four cylinder models of Chevrolet came equipped with vacuum tank fuel feed and the six cylinder 1929 models are equipped with fuel pump.

All models of Chevrolet equipped with vacuum tank feed have two strainer screens in the gas line. One is located in the head of the vacuum tank as shown at E, Fig. 1, and the other is located at the carburetor as shown in Fig. 2.

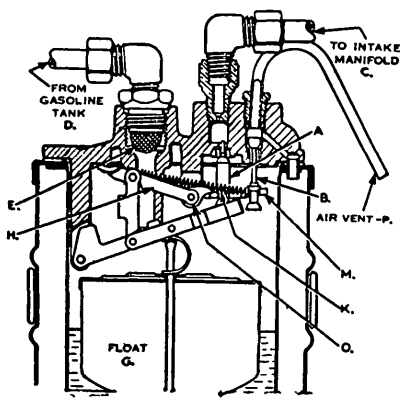


Fig. 1

Upper half of vacuum tank showing cross section view of gas line screen (E).

The strainer at the carburetor should be removed and cleaned every 2000 miles. To clean the strainer, disconnect the gasoline line and unscrew the strainer cap screw and lift the strainer cap. Remove the gauze and clean thoroughly by washing in gasoline and blowing through it with compressed air. Clean the inside of the strainer cap thoroughly and reassemble, making sure the gaskets are in place at both ends of the strainer cap

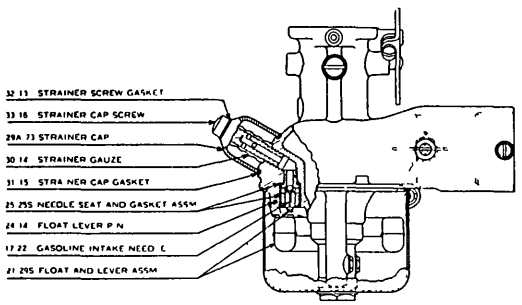

32 13 STRAINER SCREW GASKET
33 16 STRAINER CAP SCREW
29A 73 STRAINER CAP
30 14 STRAINER GAUZE
31 15 STRAINER CAP GASKET
25 295 NEEDLE SEAT AND GASKET ASSM
24 14 FLOAT LEVER PIN
17 22 GASOLINE INTAKE NEEDLE
21 295 FLOAT AND LEVER ASSM

Fig. 2

Cutaway section of carburetor showing location of gas line screen, strainer cap screw, strainer cap and strainer cap screw gasket.

and that the strainer cap screw and gasoline line are properly tightened and do not leak.

To clean the gas line screen E, Fig. 1, at the vacuum tank, disconnect the gas line D from the gasoline supply tank and remove the elbow and bushing together with the gasoline strainer. Clean with air and gasoline.

All models of Chevrolet equipped with fuel pump feed have one strainer screen in the gasoline line located in the top of the gasoline bowl at the fuel pump L, Fig. 3.

To clean the fuel pump screen, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new one.

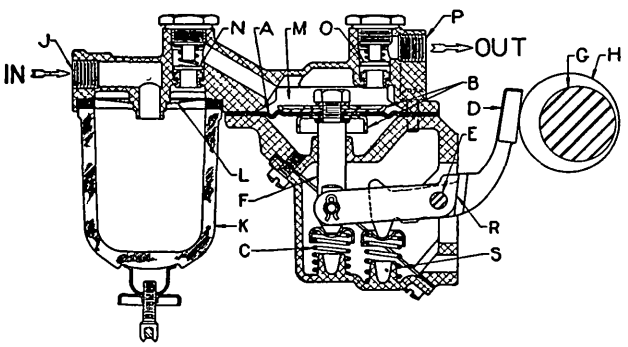


Fig 3

Cress section view of fuel pump used on Chevrolet Six, 1929. NOTE: The gasoline strainer (L) located in the top of the gasoline bowl.

Carburetor Specifications

FLOAT LEVEL

Superior (Series K and V) 1925-26-27 (Carter Model RXO and DRXO).—The correct level is 9/16″ from top of float to machined surface of casting when needle is closed (Fig. 4). This measurement should be taken on side of float opposite gasoline intake needle, using steel scale and measuring from machined surface of casting. Make certain scale does not rest on gasket or unmachined surface of carburetor body. If for any reason float lever must be reset, it may be done by bending float lever lip that comes in contact with gasoline intake needle. Bending lip up will lower float and bending it down will raise it. Only a very slight bend is necessary to change level.

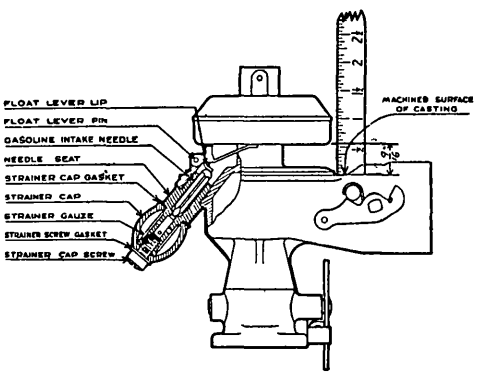


Fig. 4

Sectional view of Carter carburetor showing float level measurement for Model RXO and DRXO

Capital AA—1927 (Carter Model RAJXO).—The correct level is 9/16″ from top of float to machined surface of casting when needle is closed (Fig. 5). This adjustment should be taken on side of float opposite gasoline intake needle, using steel scale and measuring from machined surface of casting. Make certain scale does not rest on gasket, or unmachined surface of carburetor body. If for any reason float level must be reset, it may be done by bending float lever lip that comes in contact with gasoline intake needle. Bending lip up will lower float level, and bending it down will raise it. Only a very slight bend is necessary to change level.

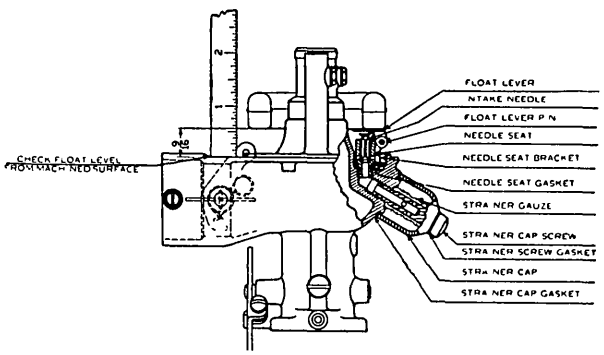


Fig 5

Sectional view of Carter carburetor Model RAJXO, showing point at which level adjustment should be taken

National AB—1928 (Carter Model RAKXO).—The correct float level is 31/64″ from top of float to machined surface of casting when needle is closed. This measurement should be taken on side of float opposite gasoline intake needle, using steel

scale and measuring from machined surface of casting, as per Fig 6 Make certain scale does not rest on gasket, or unmachined surface of carburetor body If for any reason float level must be reset, it may be done by bending float lever lip that comes in contact with gasoline intake needle Bending lip up will lower float level and bending it down will raise it Only a very slight bend is necessary to change level

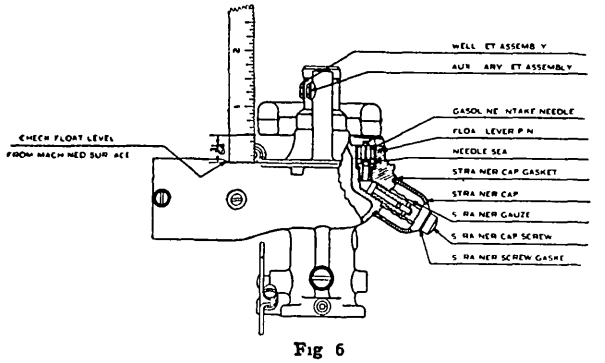


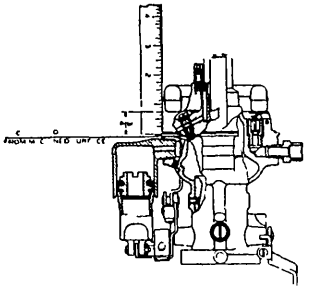
Fig 6

Sectional view of Carter carburetor Model RAKXO, showing point at which float level measurement should be taken The correct float level for this model carburetor is 31/64".

Chevrolet Six 1929-30 (Carter Model RJH-08) —The correct level is three-quarters inch from top of float to machined surface of casting when needle is closed (Fig 7) This measurement should be taken on side of float opposite gasoline intake needle If, for any reason, float level must be reset, it may be done by bending float lever lip that comes in contact with gasoline intake needle Bending lip up will lower float level and bending it down will raise it Only a slight bend is necessary to change level

Fig 7

Sectional view of carburetor float assembly used on Chevrolet International Six 1929 showing point at which float level measurement should be taken The correct float level is ¾ inch from top of float to machined surface of casting when needle is closed



CARBURETOR SPECIFICATION DIAGNOSIS

Jet Combination and Sizes

Superior (Series K and V) 1925-26-27 —Following jets used in RXO carburetors from January 1, 1925, to May 1, 1925

Carter Part No	Description	Drilled with 6 accelerating jets Vertical	Diagonal
12-61	Standard	66	70
12-62	1st size leaner than standard	67	70
12-65	2nd size leaner than standard	68	70

Above jets now obsolete For greater gas mileage, select number from jets listed below

Jets for Model RXO Chevrolet carburetor now in use Same were put into production May 1, 1925.

Carter Part No	Description	Drilled with 6 accelerating jets Vertical	Diagonal
12-58	Standard	67	70
12-71	1st size leaner than standard	68	70
12-72	2nd size leaner than standard	68	71
12-73	Extra lean	70	70

In order that Chevrolet cars give uniformly good mileage and performance in all parts of the country, multiple jet nozzle No 12-58 is used as standard in production This jet will give good mileage, performance and will warm up motor readily

Three jets leaner than standard are built for locations with extreme heat or high altitudes. Where leaner jet is substituted for a standard jet during the summer months in the Northern states, car owners should retain original jet for winter use

Carburetor Specifications

Superior (Series K and V) 1925-26-27 —The following is a complete list of specifications for Carter Carburetor Model RX-O Size 1" To read, hold carburetor air intake from you

Size Main Venturi. 23/32 inch Lower well diameter 11/32 inch

Standpipe: Round nose top ¼ inch I D Four No 37 air holes

Low Speed Jet: No 71 drill By-pass No 50 drill Economizer No 55 drill

Float Level: Top of float to be 9/16 inch from machined surface of casting

Idle Port Opening Above Valve With Valve Tight Closed: 050 inch to 054 inch

Idle Port Length: 130 inch Width 040 inch

Type of Idle: Air bleed

Nozzle: Diagonal Jet No 70 drill Vertical jet No 67 drill Top jet No 38 drill

Accelerating Jets	No	Drill Size	Distance from Top of Tube
(Combination No 34)	4	67	3/8 inch
" "	4	65	9/16 inch
" "	1	38	13/16 inch

Throttle Lever: Location Side adjacent to air intake Type Stamped steel, double ended Length of arms 1¼ inch and 1 5/16 inch In center of travel long arm points left

To Close Throttle: Move long arm down

Choker: Location of valve In carburetor air intake Type Butterfly Choker lever on left side In open position Points toward you To close choker, move lever up

Gasoline Intake Needle: Standard Needle seat Standard

Gasoline Line: Size 5/16 inch Type of connection S A E

Strainer Cap: Straight Points to right side

Remarks: Recommended setting for idle adjustment screw One to one and one-half turns open To make mixture richer Turn adjustment screw in Do not idle engine below 300 r p m with spark retarded

Jet Combination and Sizes

Capital AA—1927 (Carter Model RAJXO) —Leaner mixture is obtained by installing smaller well jet

43-17S Well jet assembly size No 70
43-19S Well jet assembly size No 71

Richer than standard

43-11S Well jet assembly size No. 68

Carburetor Specifications

Capital AA—1927.—The following is a complete list of specifications for Carter Carburetor Model RAJXO. To read, hold carburetor air intake from you.

Size Main Venturi: 13/16 inch. Upper well depth from standpipe seat: 3/8 inch. Lower well diameter: 11/32 inch.

Standpipe: Flare top 11/32 inch I. D. Four No. 37 air holes.

Low Speed Jet: No. 72 drill. By-pass No. 56 drill, Economizer: No. 54 drill.

Float Level: Top of float to be 9/16 inch from machined surface of casting.

Idle Port Opening Above Valve With Valve Tight Closed: .020 inch to .025 inch.

Idle Port Length: .130 inch. Width: .040 inch.

Type of Idle: Air bleed.

Main Well Jet Size: No. 69 drill. Auxiliary jet size: No. 62 drill, plus .0005, minus 0.

Nozzle: Diagonal. Jet: None. Vertical jet: No. 57 drill. Top jet: No. 38 drill.

Accelerating Jets	No.	Drill-Size	Distance from Top of Tube
(Combination No. 34)	4	67	3/8 inch
" "	4	65	9/16 inch
" "	1	38	13/16 inch

Throttle Lever: Location: Side adjacent to air intake. Type: Stamped steel, double ended. Length of arms: 1¼ inch and 1 5/16 inch. In center of travel long arm points left.

To Close Throttle: Move long arm down.

Choker: Location of valve: In carburetor air intake. Type: Butterfly. Choker lever on left side. In open position, points down. To close choker, move lever away from you and up.

Gasoline Intake Needle: Square vertical. Needle seat: Vertical.

Gasoline Line: Size 5/16 inch. Type of connection S.A.E.

Strainer Cap: Straight. Die cast. Points to right side.

Remarks: Recommended setting for idle adjustment screw: Three-quarter to one and one-half turns open. To make mixture richer: turn adjustment screw in. Do not idle engine below 280 r.p.m. with spark retarded.

Carburetor Specifications

National AB—1928.—The following is a complete list of specifications for Carter Carburetor Model RAKXO size 1":

Size Main Venturi: 13/16 inch. Upper well depth from standpipe seat: 3/8 inch. Lower well diameter: 11/32 inch.

Standpipe: Flare top 11/32 inch I. D. Four No. 37 air holes. Six No. 33 cross holes, 3/8" from top.

Economizer Sleeve: Single action.

Low Speed Jet: No. 68 drill. By-pass: No. 51 drill. Economizer: No. 56 drill.

Float Level: Top of float to be 31/64 inch from machined surface of casting.

Idle Port Opening Above Valve with Valve Tight Closed: .050 inch to .054.

Idle Port Length: .176 inch. Width: .040 inch.

Type of Idle: Air bleed.

Main Well Jet Size: No. 69 drill. Auxiliary jet size: No. 59 drill.

Nozzle: Diagonal Jet: None. Vertical jet: No. 57 drill. Top jet No. 38 drill.

Accelerating Jets	No.	Drill-Size	Distance from Top of Tube
(Combination No. 34)	1	54	15/32 inch
" "	1	67	21/32 inch
" "	1	38	27/32 inch

Throttle Lever: Location: Side adjacent to air intake. Type: Stamped steel, double ended. Length of arms 1¼ inch and 1 5/16 inch. In center of travel long arm points left.

To Close Throttle: Move long arm down.

Choker: Location of Valve: In carburetor air intake. Type: Butterfly. Choker lever on left side. In open position, points down. To close choker, move lever away from you.

Gasoline Intake Needle: Square vertical. Needle seat: Vertical.

Gasoline Line: Size 5/16 inch. Type of connection S.A.E.

Strainer Cap: Straight. Die cast. Points to right side.

Remarks: Recommended setting for idle adjustment screw: One to one and one-half turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 280 r.p.m. with spark retarded.

Jet Combination and Sizes

International Six—1929 (Carter Model RJH-08.—The mixtures may be varied for different climates and fuels by changing well jet, which is located in base of body the same as on previous models. Standard Well Jet is No. 57; Richer Jet is No. 56½; Leaner Jets No. 58, 59 and 60. These jets may be used wherever a change in mixture ratio is deemed necessary.

Carburetor Specifications

International Six—1929.—The following is a complete list of specifications for Carter Carburetor Model RHJ-08. To read, hold carburetor air intake from you:

Size of Main Venturi: 7/8 inch. Upper well depth from standpipe seat: ¼ inch. Lower well diameter: 11/32 inch.

Standpipe: Round nose top 7/16 inch I. D.; with 5/16 inch venturi. One No. 51 air hole in base. Two air slots .189 to .192 high by .311 to .314 wide.

Low Speed Jet: Low: No. 65 drill. By-pass No. 50 drill. Economizer: No. 51 drill.

Float Level: Top of float to be ¾ inch from machined surface of casting, opposite needle seat.

Accelerating Pump: Type: Delayed action. Discharge jet size: No. 75 drill. Feed to ball check: No. 40 drill.

Inside Vent: No. 50 drill. Outside vent: None.

Idle Port Opening Above Valve With Valve Tight Closed: .050 to .054 inch.

Idle Port Length: .156 inch. Width: .040 inch.

By-Pass Under Port: No. 55 drill.

Type of Idle: Air bleed.

Main Well Jet: Size: No. 57 drill. Auxiliary jet: None.

Nozzle: Diagonal jet: None. Vertical jet: No. 48 drill. Top jet No. 38 drill.

Accelerating Jets	No.	Drill-Size	Distance from Top of Tube
(Combination No. 64)	2	56	9/16 inch
" "	2	56	5/8 inch
" "	2	53	3/4 inch
" "	2	69	15/16 inch
" "	2	53	1 1/8 inch
" "	2	47	1 3/8 inch

Feed to Vertical Jet: No. 44 drill.

Metering Rod: Diameter: Top .068 inch. Bottom: .064 inch. Length: 4 57/64 inch.

Throttle Levers: Two: One adjusting, one loose. Type: Stamped steel. Location adjusting lever: Left side. Length: 1¼ inch. Location loose lever: Right side. Length: 1 inch. In center of travel adjusting lever points up. To close throttle, move lever from you.

Choker: Type: Cone. Location: In venturi. Choker lever on right side. In open position: Points down. To close choker, move lever from you.

Gasoline Intake Needle: Square vertical. Needle seat: Vertical with No. 48 needle seat hole.

Gasoline Line: Size 5/16 inch. Type of connection: Compression.

Remarks: Recommended setting for idle adjusting screw: Five-eighths to one and one-quarter turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 r.p.m. with spark retarded.

Carburetor Specifications

Universal Series AD (Imperial) 1930.—The following is a complete list of specifications for Carter Carburetor Model RJH08.

Size Main Venturi: 15/16 inch. Upper well depth from standpipe seat ¼ inch. Lower well, diameter 11/32 inch.

Standpipe: Round nose 7/16 inch I. D. with 5/16 inch venturi. Two No. 52 air holes in base. Two air slots .189 to .192 inch high by .311 to .314 inch wide. Two No. 42 cross holes 7/16 inch from top.

Low Speed Jet: No. 65 drill. By-pass No. 54 drill. Economizer: No. 53 drill.

Float Level: Top of float to be ¾ inch from machined surface of casting, opposite needle seat.

Accelerating Pump: Type: Delayed action. Discharge jet size: No. 75 drill. Feed to ball check size: No. 45 drill.

Stroke: Summer setting 17/64 inch; winter setting ½ inch to 17/32 inch.

Inside Vent: No. 50 drill. Outside vent: None.

Idle Port Opening Above Valve With Valve Tight Closed: .040 inch to .044 inch.

Idle Port: Length: .156 inch. Width: .040 inch.

By-Pass Under Port: No. 55 drill.

Type of Idle: Air bleed.

Main Well Jet: Size: No. 56 drill.

Nozzle: Vertical: No. 48 drill. Top jet. No. 26 drill.

Accelerating Jets	No.	Drill-Size	Distance from Top of Tube
(Combination No. 75)	2	56	15/32 inch
" "	2	56	17/32 inch
" "	2	64	27/32 inch
" "	2	64	27/32 inch
" "	2	53	1 1/32 inch
" "	2	47	1 9/32 inch

Metering Rod: Diameter: Top .071 inch. Bottom: .063 inch. Length: 4 57/64 inch.

Throttle Levers: Two: One adjusting, one loose. Type: Stamped steel. Location adjusting lever: Left side. Length: 1¼ inch. Location loose lever: Right side. Length: 1 inch. In center of travel adjusting lever points up. To close throttle, move lever from you.

Choker: Type: Cone. Location: In venturi. Choker lever on right side. In open position: Points down. To close choker, move lever from you.

Gasoline Intake Needle: Square vertical. Needle seat: vertical with No. 48 needle seat hole.

Gasoline Line: Size: 5/16 inch. Type of connection: Compression. Straight.

Remarks: Recommended setting for idle adjusting screw: Five-eighths to one and one-quarter turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 r.p.m.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and year	Model	Engine	No. cyl.	Bore and stroke	Carb. model and size
CHEVROLET					CARTER
1925	K	Own	4	3 11/16"x4"	RX-0-1"
1926	V	Own	4	3 11/16"x4"	RX-0-1"
1927	Capitol	Own	4	3 11/16"x4"	RAJXO-1"
1928	National	Own	4	3 11/16"x4"	RAKXO-1"
1929	International	Own	6	3 1/8"x3 3/4"	RJH-08-1 1/16"
1930	Universal	Own	6	3 1/16"x3 3/4"	RJH-08-1 1/16"

CHEVROLET SUPERIOR

(Series K and V) 1925-26-27

Information.—Some of the early models of Chevrolet Superior came equipped with Zenith carburetor Model V4B.

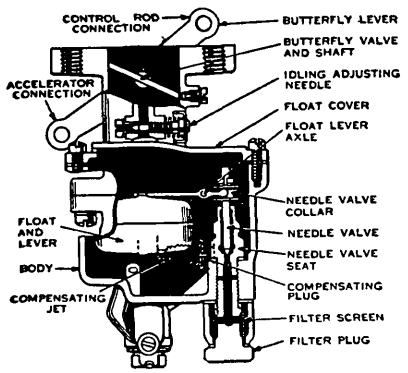


Fig. 8

Cross section view of Zenith Model V4B carburetor used on early models of Chevrolet Superior.

The later models were equipped with Carter RXO (single adjustment). Model DRXO (double adjustment) is also adaptable to the Series K and V cars. This model of carburetor is equipped with a high speed adjustment for special conditions of altitude and temperature.

Zenith Model V4B

Idle Adjustment.—When the throttle valve shown in Fig. 8 is nearly closed and the motor is "turned over", there is a very strong suction at the edge of the throttle valve where the idling hole is located. Under this condition little or no gas is supplied by the main jets. Gasoline is then drawn through the idling jet. In the model V4B the air is measured through the idling needle valve seat in accordance with the adjustment of the idling needle valve shown in Fig. 8. The mixture then passes through the idling hole and on into the motor. Screwing in or clockwise on the idling needle valve shuts off the air and richens the mixture. Screwing out or anti-clockwise admits more air and accordingly gives a lean mixture.

Carter Model RXO and DRXO

The Model RXO Carter Carburetor, standard equipment on superior model series K and V Chevrolet, was especially designed for this motor.

Model DRXO is also adaptable to Series K and V Chevrolet car. By means of its high speed adjustment special conditions of altitude or temperature can be met.

Adjustment.—To adjust the mixture for Model RXO, open idle adjusting screw 1 to 1½ turns from its closed position, or until engine hits evenly

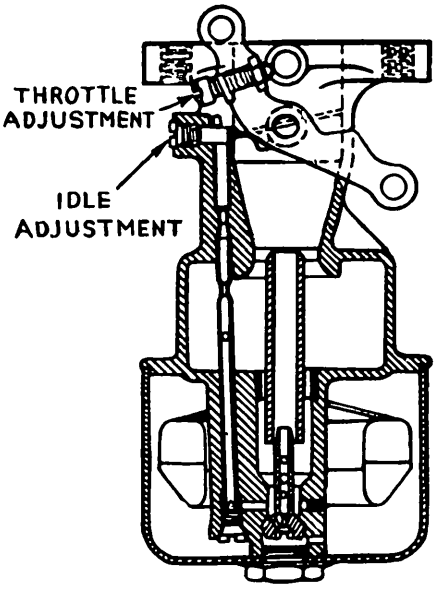


Fig. 9

Cross section view of Model RXO carburetor used on Chevrolet Models K and V.

without loading or missing. Turning this screw in gives a richer mixture. (Fig. 9.)

With hand throttle on steering wheel closed, set throttle lever adjusting screw so engine will run about 250 revolutions per minute with spark retarded. To determine speed of engine when idling, put your finger on one of the rocker arms and count the number of times it lifts in 12 seconds. Multiply this number by 10 and the result is the number of revolutions the engine is turning over per minute. If engine runs too fast, back adjusting screw out; if too slow, turn in until proper speed is obtained.

Throttle adjusting screw is locked in throttle lever by tension on the lugs through which the screw passes. If screw becomes loose these lugs

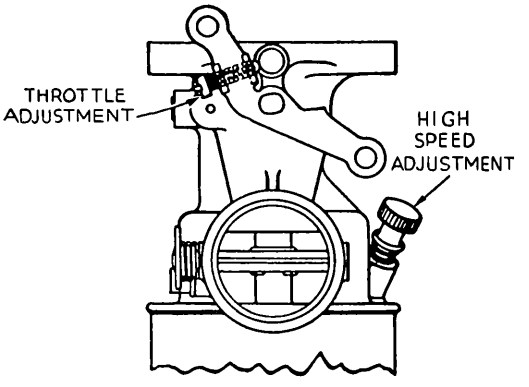


Fig. 10

Sectional view of Model DRXO Carter carburetor adaptable to Chevrolet Series K and V for special conditions of altitude or temperature. This carburetor is equipped with high speed adjustment.

should be bent slightly until proper tension is again obtained.

Adjust low speed or idle adjustment for Model DRXO the same as Model RXO. Screw adjustment in to richen mixture. Set mixture so that motor runs evenly at idle engine speed.

High speed adjustment (Fig. 10) screws out to richen mixture. This needle may be set to secure any mixture ratio desired by the operator.

If difficulty should be experienced in obtaining smooth motor action, see that all manifold flange nuts are tight and that the manifold gaskets do not leak.

Be sure that gas line strainers are clean and that all jets are the right size and clean.

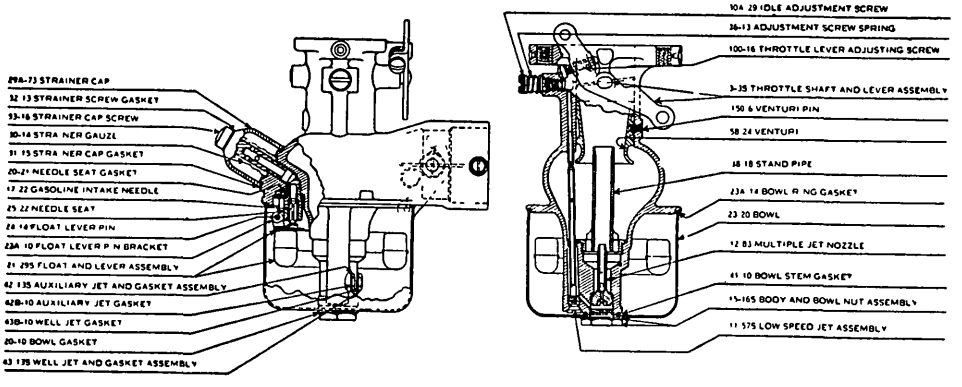


Fig. 11

Cross section of Carter carburetor Model RAJXO. These are multiple jet plain tube type carburetors with only one adjustment which is for idling. Correct idle adjustment for this carburetor is approximately ¾ to 1½ turns open of the idle adjustment screw.

CHEVROLET CAPITAL AA—1927

The carburetor used on Chevrolet Capital AA—1927 is a plain tube multiple jet type Carter. There is only one adjustment which is for idling the motor.

Carter Model RAJXO

Adjustment.—To adjust the mixture open idle adjusting screw ¾ to 1½ turns from its closed position, or until engine hits evenly without loading or missing. Turning this screw in gives a richer mixture. (Fig. 11.)

Mixture proportions may be varied by changing the main well jet only.

With hand throttle on steering wheel closed, set throttle lever adjusting screw so engine will run about 280 revolutions per minute with spark retarded. To determine speed of engine when idling, put your finger on one of the rocker arms and count the number of times it lifts in 12 seconds. Multiply this number by 10 and the result is the number of revolutions the engine is turning over per minute. If engine runs too fast, back adjusting screw out; if too slow, turn in until proper speed is obtained.

Throttle adjusting screw is locked in throttle lever by tension on the lugs through which the screw passes. If screw becomes loose these lugs should be bent slightly until proper tension is again obtained.

Low speed jet assembly supplies gasoline to motor at idle engine speed and up to approximately 15 miles per hour, gasoline being supplied by the auxiliary jet. The flow of fuel crossing idling jet keeps it washed clean at all times. At idle, gasoline is drawn through low speed jet and idling port at edge of throttle valve. Idle adjustment screw regulates amount of air entering this port. Backing out adjustment screw admits more air and consequently makes idling mixture leaner.

If it should become necessary to remove the carburetor for cleaning, never use metal wire for removing dirt from the jets. The carburetor should be thoroughly washed in gasoline and blown out with air.

CHEVROLET NATIONAL AB—1928

Carter carburetor Model RAKXO was standard equipment on Chevrolet National AB—1928. It is a multiple jet plain tube carburetor with only one adjustment which is for idling.

If difficulty is experienced in obtaining a smooth running engine, check for leaky manifold gaskets or dirty jets.

Carter Model RAKXO

Adjustment.—To adjust the mixture open idle adjusting screw one to one and one-half turns from its closed position, or until engine hits evenly without loading or missing. Turning this screw in gives a richer mixture. (Fig. 12.)

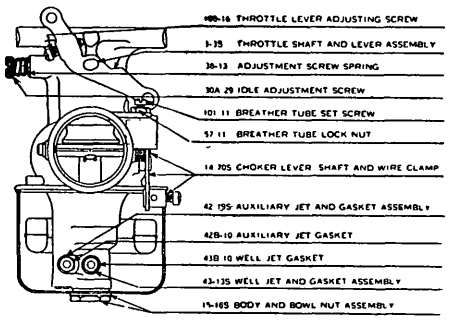

THROTTLE LEVER ADJUSTING SCREW
THROTTLE SHAFT AND LEVER ASSEMBLY
ADJUSTMENT SCREW SPRING
IDLE ADJUSTMENT SCREW
BREATHER TUBE SET SCREW
BREATHER TUBE LOCK NUT
CHOKER LEVER SHAFT AND WIRE CLAMP
AUXILIARY JET AND GASKET ASSEMBLY
AUXILIARY JET GASKET
WELL JET GASKET
WELL JET AND GASKET ASSEMBLY
BODY AND BOWL NUT ASSEMBLY

Fig. 12

View of Carter carburetor Model RAKXO showing position of idling adjustment screw.

Mixture proportions may be varied by changing the main well jet only.

Idle engine speed is regulated by throttle lever adjusting screw. This acts as a stop for the throttle lever and prevents throttle valve from closing too tight and allowing engine to stop when accelerator is released.

With hand throttle on steering wheel closed, set throttle lever adjusting screw so engine will run about 280 revolutions per minute with spark retarded. To determine speed of engine when idling, put your finger on one of the rocker arms and count

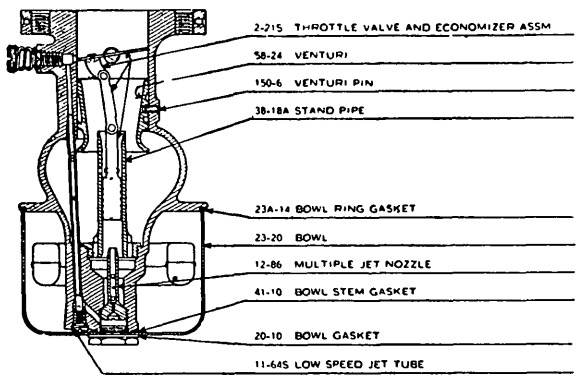


Fig. 13

Cross section view of Carter carburetor Model RAKXO, showing throttle valve and economizer assembly. This is a plain tube multiple jet type carburetor.

the number of times it lifts in twelve seconds. Multiply this number by 10 and the result is the number of revolutions the engine is turning over per minute. If engine runs too fast, back adjusting screw out; if too slow, turn in until proper speed is obtained.

Throttle adjusting screw is locked in throttle lever by tension on the lugs through which the screw passes. If screw becomes loose these lugs should be bent slightly until proper tension is again obtained.

Low speed jet assembly supplies gasoline to motor at idle engine speed and up to approximately 15 miles per hour, gasoline being supplied by the auxiliary jet. The flow of fuel crossing idling jet

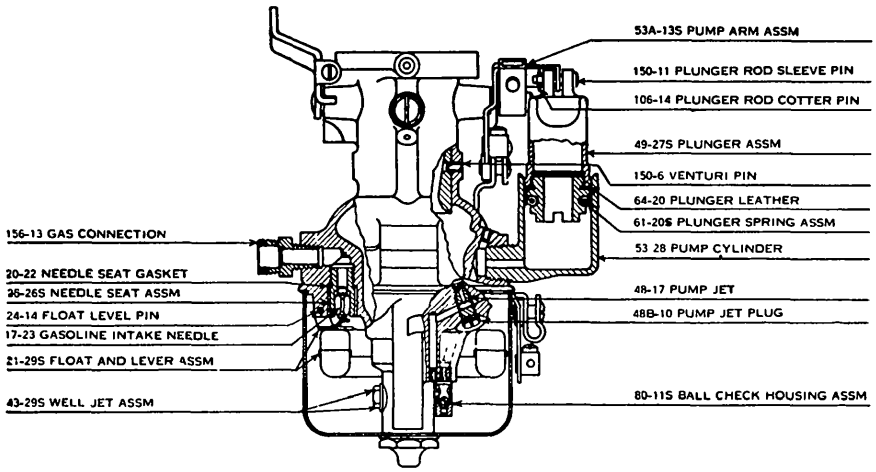


Fig. 15

Cross section view of Carter carburetor used on Chevrolet International Six 1929 showing accelerating pump assemblies.

keeps it washed clean at all times. At idle, gasoline is drawn through low speed jet and idling port at edge of throttle valve. Idle adjustment screw regulates amount of air entering this port. (Fig. 12.) Backing out adjustment screw admits more air and consequently makes idling mixture leaner.

CHEVROLET SIX—1929

The International Chevrolet Six was equipped with Carter Model RJH-08 multiple jet plain tube carburetor. This was an improved design of Carter and was equipped with an accelerating pump. It also had a metering rod attached to the throttle valve (Fig. 14).

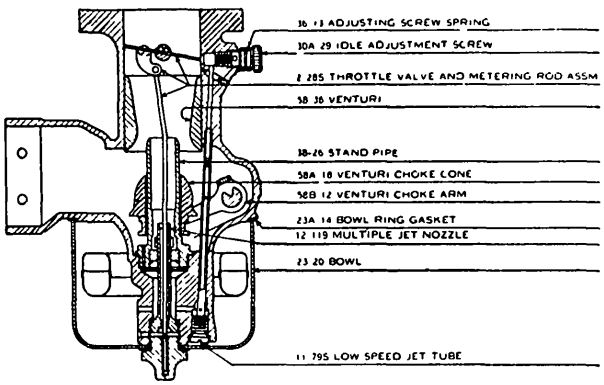


Fig 14

Cross section of Carter carburetor Model RJH-08 showing position of idling adjustment screw and fuel metering assembly attached to the throttle.

Carter Model RJH-08

Adjustment.—To adjust idling mixture retard spark—open idle adjustment screw five-eighths to one and one-quarter turns, or until engine hits evenly without loading or missing (Fig. 14). Turning this screw in gives a richer mixture.

Idle engine speed is regulated by throttle lever adjusting screw. This acts as a stop for throttle lever and prevents throttle valve from closing too tight and allowing engine to stop when accelerator is released. With throttle on instrument board closed, set throttle lever adjusting screw so engine will run 300 revolutions per minute. If engine runs too fast, back adjusting screw out. If too slow, turn in until proper speed is obtained. Throttle adjusting screw is locked in throttle lever by tension on lugs through which screw passes. If screw becomes loose these lugs should be bent slightly until proper tension is again obtained.

ACCELERATING PUMP

International Six—1929 (Carter Model RJH-08).—Accelerating pump (Fig. 15) consists of an air chamber and fuel container which has been added to accelerating well. Pump is actuated by throttle lever.

When throttle valve is closed, gasoline is drawn into pump cylinder through ball check housing assembly.

Ball check automatically closes when throttle is opened, air is compressed in plunger and a fine spray of gasoline is discharged into venturi through pump jet, and is mixed with the air passing through the venturi.

About two seconds is required to discharge contents of pump, supplying sufficient gas for accelerating under any and all conditions.

Leaks in pump connections or dirt in pump jet or ball check will interfere with its action. If pump leather becomes dried out put a few drops of castor oil on it. It is not necessary to remove plunger to perform this operation.

If plunger is removed from cylinder, special tube must be used for reassembling, otherwise leather will be damaged.

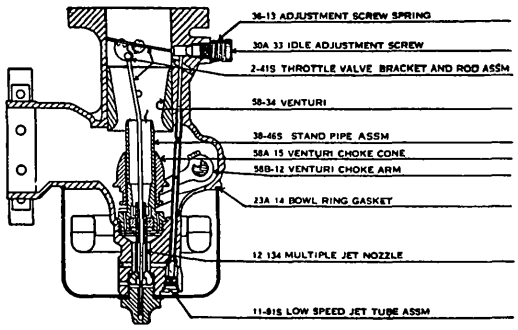

36-13 ADJUSTMENT SCREW SPRING
30A 33 IDLE ADJUSTMENT SCREW
2-41S THROTTLE VALVE BRACKET AND ROD ASSM
58-34 VENTURI
38-46S STAND PIPE ASSM
58A 15 VENTURI CHOKE CONE
58B-12 VENTURI CHOKE ARM
23A 14 BOWL RING GASKET
12 134 MULTIPLE JET NOZZLE
11-81S LOW SPEED JET TUBE ASSM

Fig. 16

Cross section view of Carter carburetor RJHo8 used on Chevrolet Universal Series AD 1930. The throttle valve metering rod 2-415 should work free in the multiple jet nozzle.

UNIVERSAL 6 (Series A. D.) 1930

The carburetor adjustment procedure for the 1930 Chevrolet models is the same as for the 1929 models with the exception that the lever which operates the accelerator pump plunger arm (Fig. 17) is provided with three adjustments or settings. The first hole or setting is for winter driving and is marked (W); the center hole is for normal climatic conditions and is not marked, while the third hole is for summer and is marked (S).

The cars when shipped from the factory have the pump plunger arm set in its normal position and the change from normal to summer setting should be made when atmospheric temperatures are consistently above 65° F. The change from normal or summer setting to winter setting should be made when the atmospheric temperatures are consistently below 65° F.

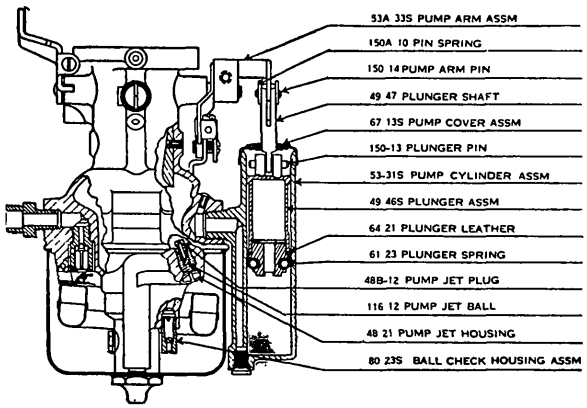
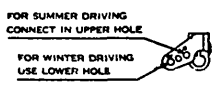

53A 33S PUMP ARM ASSM
150A 10 PIN SPRING
150 14 PUMP ARM PIN
49 47 PLUNGER SHAFT
67 13S PUMP COVER ASSM
150-13 PLUNGER PIN
53-31S PUMP CYLINDER ASSM
49 46S PLUNGER ASSM
64 21 PLUNGER LEATHER
61 23 PLUNGER SPRING
48B-12 PUMP JET PLUG
116 12 PUMP JET BALL
48 21 PUMP JET HOUSING
80 23S BALL CHECK HOUSING ASSM

Fig. 18

Cross section view of Carter carburetor Model RJHo8 used on Chevrolet 1930 showing accelerating pump assembly. It is important that plunger spring is in place and plunger leather does not leak.

Fig 17

Accelerating pump plunger arm The first hole is marked W and is for winter driving. The middle hole is for normal climatic conditions and is not marked, while the last hole is for summer and is marked S.



The center or normal setting will give fair performance for usual climatic conditions, but if the best performance is desired, we suggest that changes be made according to the above instructions.

Chrysler 1925-30

Motor Tune-Up

Important.—The most important operations in a Chrysler motor tune-up are cleaning and setting of distributor and spark plug points and ignition timing. The ignition timing should be set by piston travel with timing gauge (Fig. 6). If timing is off .003″ to .005″ piston travel motor performance will be affected.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain; adjust if necessary.
   Note: Timing chain adjustment should be made before checking ignition or valve timing. This is important and must be correct to obtain efficient results (see chain adjustment).
3. Adjust valve tappets.
4. Check ignition timing; adjust if necessary.
5. Check manifold gaskets; see that manifold flange nuts are tight.
6. Clean gas line screens.
   Note: On models equipped with fuel pump there are two strainer screens in top of sediment bowl, one at the pump and one at the carburetor (see gas line screens).
7. Check manifold heat control; adjust if necessary.
   Note: See that exhaust manifold heat control (Fig. 1) opens and closes properly. If too much slack in flexible control tube, valve will remain closed when control button on dash is pushed in. If heat control valve remains closed danger of cracking manifold.
8. Check fan belt; adjust if loose.
9. Adjust carburetor if necessary.
   Note: If carburetor jets are dirty the carburetor should be removed and thoroughly cleaned. Be sure and install new carburetor flange gasket when carburetor is put back on car.
10. Road test car.
    Note: The ignition should never be advanced beyond a point of where a spark knock occurs except under full load condition.

Ragged Idle

Ignition Timing not Properly Synchronized.—Of all the motor tune-up operations for Chrysler, the most critical is ignition timing, spark plug and contact point setting. Those models equipped with distributors having double breaker arms should be carefully and accurately synchronized. If the points are not properly synchronized the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds.

To correct this condition synchronize the points as described under ignition timing.

Distributor and Spark Plug Points.—On all models of Chrysler care should be exercised when adjusting the distributor points to see that the spark plug points are properly adjusted and that the distributor points are set from .002″ to .003″ less than the spark plug points. See ignition timing table for correct setting.

Spark Plug Gap.—On models 72, 75 and 77 failure to idle may be caused by the spark plug gaps being set too close together. The plug gap clearance on these models should not be less than .027″ nor more than .030″.

Warped Carburetor Flange.—Failure of motor to idle may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Extreme care should be exercised when bolting the carburetor to the intake manifold to see that both sides come up evenly.

The carburetor flange should be checked with a straight edge to see that it is perfectly square. If it is found to be out of true, square up with a flat mill file. Never use a hard gasket between the carburetor and manifold flanges. Soft gaskets can be purchased ready to install at any supply house or Chrysler service station.

High Vacuum in Manifold.—A poor idling condition on deceleration may be caused by a high vacuum in the manifold above the throttle on cars equipped with Stromberg U and DX carburetors. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to load and roll will be noticed. In extreme cases the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct the trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16″ in toward the center of the carburetor throat opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass jet.

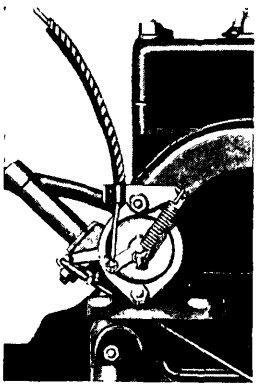


Fig 1

Manifold heat control valve used on all 6 cylinder models of Chrysler. If this valve does not work properly, there is danger of cracking manifold.

Carburetor.—When tuning up a motor, the carburetor is the last unit that should be checked. Do not, under any condition, change or tamper with the carburetor until after the ignition and valve

timing and motor compression have been checked. Follow closely, all recommendations relative to timing given in the paragraphs above. If the trouble is finally traced to the carburetor, first make certain that the carburetor has been properly adjusted. (See carburetor adjustment instructions in the Carburetor Adjustment section.)

If the trouble still persists, remove and thoroughly clean all jets and passages. If cleaning and correctly adjusting the carburetor does not eliminate the trouble a poor idling condition may be caused by someone tampering with the idling openings. Turn to idling jets in Carburetor Specification Diagnosis section.

Poor Acceleration

Ball and Ball Model DB Main Nozzle and Nozzle Vent.—A decided flat spot on acceleration may be caused by the main nozzle not setting squarely under the nozzle vent. If the nozzle has been removed for any reason be sure that the nozzle sets squarely under the nozzle vent when the nozzle is screwed into place. The nozzle extends into the nozzle vent for a short distance and can be seen from the top by removing the upper half of the carburetor body. There is approximately 1/64″ clearance on all sides between the nozzle and nozzle vent when the nozzle is screwed into place. For more detail see nozzle vent in Ball and Ball section under Carburetor Specification Diagnosis page 71, Fig. 13.

Stromberg, Pump Lever Fulcrum Screw.—Failure of motor to accelerate on cars equipped with Stromberg DX carburetors may be caused by the accelerating pump lever fulcrum screw working loose and causing the pump lever to bind.

The car owner will probably complain that the car will accelerate properly at times and at other times it will have a decided flat spot.

Correct by tightening the fulcrum screw.

Weak Main Nozzle Spring.—On Chrysler cars equipped with Ball and Ball Model S-1 carburetors poor motor performance may be caused by the jet spring (E) Fig. 20 weakening in service. When this occurs, the main nozzle will drop down out of the nozzle vent causing an unbalanced condition between the fuel and air.

To correct, replace with new spring.

Carburetor.—Poor acceleration may be caused by a pump reducer or pump nozzle of the wrong size or on carburetors equipped with an accelerating well, the accelerating well bleeder may be of the wrong size. On carburetors equipped with a pump stroke adjustment, the pump stroke adjustment may be wrong. See information for accelerating pump or accelerating well bleeders in the section under Carburetor Specification Diagnosis.

Lack of Power

Timing.—Lack of power may be caused either by improper or incorrect ignition or valve timing. Check both the ignition and valve timing.

Carburetor.—When tuning a motor, the carburetor is the last unit that should be checked. Do not, under any consideration, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. Follow closely all recommendations relative to timing given in the paragraphs above.

If the trouble is finally traced to the carburetor, first make certain that the carburetor has been properly adjusted (see carburetor adjustment instructions in the Carburetor Adjustment section).

If the trouble still persists, remove and thoroughly clean all jets and passages. If cleaning and correctly adjusting the carburetor does not eliminate the trouble, turn to Carburetor Specification Diagnosis. Lack of power on cars equipped with Stromberg may be caused by the main metering jet, by-pass jet, main discharge jet, high speed air bleeder or venturi tube having been changed by someone not familiar with the correct carburetor calibration procedure.

Low Gasoline Mileage

Auxiliary Needle Valve Held Open.—On cars equipped with Stromberg Model U carburetors, low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever thus holding the auxiliary needle valve open.

To correct, set the auxiliary control lever cam so that there is approximately 1/16″ clearance between the cam and the auxiliary control lever. See Fig. 19.

Also check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works free.

Motor Loading on a Pull

If trouble is experienced with the motor loading on a pull, first check to see that the carburetor is properly adjusted (see adjustment section). If the trouble is due to the internal specifications of the carburetor having been changed, see Jet Specification Diagnosis in the Carburetor Specification Diagnosis section.

Motor Misfiring

Grounded Distributor Arm.—On cars equipped with double breaker distributors it sometimes happens that through rough handling the fibre on the movable arm is damaged or worn in such a manner that the metal portion of the arm will slip down on the bushing and ground out against the base. When this happens, three cylinders will be shorted out and can only be corrected by installing a complete new distributor arm.

Damp Distributor Head.—On all models of Chrysler equipped with sealed type distributor heads misfiring in damp weather may be caused by moisture or sweating. This trouble can be tested out by touching the top of the distributor head with the finger. If the current is leaking away as the result of moisture, a slight shock will be felt. Correct by removing the cap and cleaning thoroughly with a dry rag.

Gasoline Leaks

Loose Main Jets (Ball and Ball Carburetor) — A gasoline leak which may be confused with a leaky float valve may develop on Ball and Ball carburetors Model S-1, SV-26, SV-35 and SV-37 The trouble is generally indicated by a slow dripping of gasoline or a wet carburetor body

On the Ball and Ball models listed above, the main jet is screwed into its passage against a gasket The trouble may be caused by the jet loosening up and working down on the thread away from the gasket, thus causing a leak at the gasket between the shoulder and the carburetor body at the top of the jet

To correct, remove the hexagon nut (G) Fig 24 at the bottom of the carburetor and screw the jet up tightly against the gasket

On Chrysler cars equipped with Ball and Ball Model S-1 a leaky condition may be caused by the main discharge jet spring (E) Fig 20 weakening in service When this happens, the jet drops down away from the gasket thus permitting gasoline to seep out between the shoulder of the discharge nozzle body and the carburetor body To correct, replace with new spring.

Motor Noise

Broken Valve Push Rod.—A harsh rapping noise in time with the valve action may be caused by a piece of the mushroom at the bottom of the push rod being broken off. This trouble is generally the result of some mechanic dropping a valve lock that lodges in the push rod rack housing. When the motor is started the valve lock works down on top of the mushroom of the push rod and causes a piece of the mushroom to be broken away when the cam forces the push rod up. As the push rod works around to a point of where the cam strikes the broken edge a knock occurs.

To check remove the valve plates and by the aid of a light rotate the push rod until the broken mushroom base is located. Correct with a new push rod.

Warped Carburetor or Manifold Flange.—A whistling noise may be caused by a warped carburetor or manifold flange. This trouble can be located by the aid of a squirt can full of gasoline.

To correct, true up the manifold flange with a file and use a soft gasket between the flanges.

VAPOR LOCK IN CARBURETOR

Some trouble has been experienced by what has been variously described as missing, surging, or stopping entirely after a hard pull or after sustained high speed. The trouble is most common in hot localities and is very often mistaken for coil or condenser trouble. The trouble generally starts as the radiator water temperature approaches 180° F. and continues until in extreme cases the motor will die completely and must be left to cool before it can be started again.

As near as can be determined, this trouble is due to extreme temperature in and around the carburetor and gas lines A sufficient amount of heat is absorbed by the carburetor to cause boiling of the light ends in the fuel This causes gas bubbles to form which creates pockets, leaning down the mixture or causing it to flow with uneven delivery and producing the symptoms as explained above The trouble seems to exist regardless of the brand of fuel used but is more pronounced by the use of so-called high test or casing head gasoline This trouble is not confined to any one make or model of automobile but is a condition that is affecting the industry in general

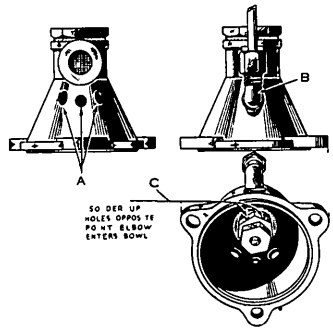


Fig 2

Showing method of venting the top of the carburetor bowl on Ball and Ball carburetor used on Chrysler This procedure is only necessary in hot localities where trouble is experienced from the fuel boiling and causing a vapor lock in the carburetor

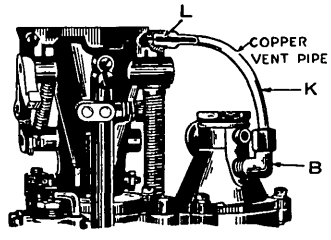


Fig 3

Showing method of venting Ball and Ball carburetor bowl to correct a condition of vapor lock caused by fuel boiling This procedure is necessary only in hot localities

Experiments have shown a wide variety of conditions and have proven conclusively that most of the trouble is caused by over-heating of the carburetor proper. On some cars the trouble can be corrected by cutting louvres in the sod pan under the carburetor to direct air currents up into the engine compartment and insulating the vacuum tank and gas lines. Changing of carburetor jets is sometimes beneficial but generally results in unsatisfactory mileage and poor engine performance.

One method of ventilating a carburetor with flat top bowl in order to reduce the possibility of fuel boiling

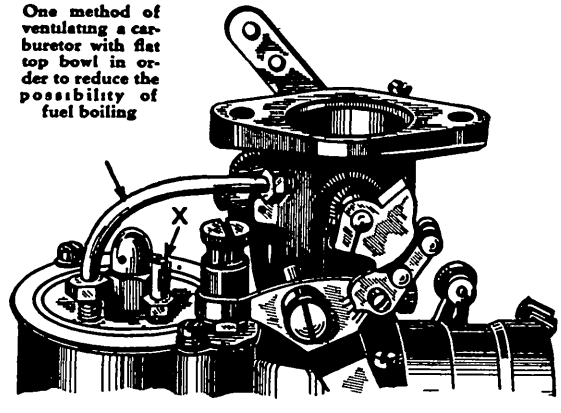


Fig 4

Showing method of venting Stromberg carburetor bowl used on Chrysler This procedure is necessary only in hot localities where trouble is experienced from fuel boiling and causing a vapor lock in the carburetor.

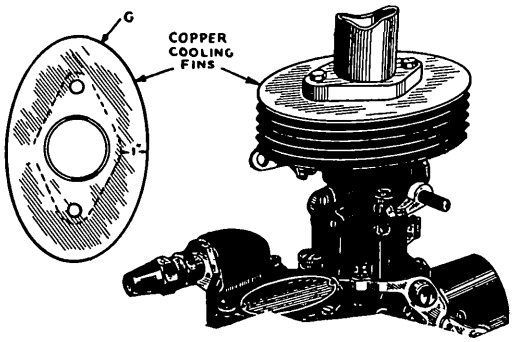


Fig 5

Showing method of inserting copper cooling fins between the manifold and carburetor flange to prevent heating of the carburetor body This procedure is necessary only in hot localities where trouble is experienced with vapor lock caused by fuel boiling in the carburetor

Two changes can be made to correct the trouble, depending upon heat conditions and the construction of the carburetor unit

The first change should be made by ventilating the carburetor bowl Two methods are shown, one for Ball and Ball type carburetors Figs 2 and 3 and the other for carburetors having a bowl with a flat top Fig 4.

To ventilate a Ball and Ball type carburetor, drill and tap a hole in the side of the cone shaped bowl cover for a ⅛" elbow (B) Fig 2

As shown at (C) solder up the one or two holes as the case may be that fall opposite the point at which the ⅛" elbow enters the bowl Then drill three holes 3/16" in diameter at (A) Take a piece of ⅛" copper pipe (K) Fig 3 and solder a bushing to one end as shown at (L) Plug the bushing and drill a No 60 drill hole through the center of the plug

Drill and tap a hole in the carburetor throat wall above the throttle and screw in the bushing as shown Bend the ⅛" copper pipe to the proper shape and connect the lower end to the elbow (B) by means of a union This completes the operation of ventilating the carburetor bowl When the engine is running, air is drawn in through the holes (A) Fig 2 over the gasoline in the bowl and discharged into the throat of the carburetor through the hole (L) Fig 3 above the throttle which has a decided cooling effect over the gasoline in the bowl and does not materially affect the carburetor adjustment or gas mileage

On carburetors with flat top bowls, Fig 4, the installation is practically the same with the exception that the intake vent hole should have a short stand pipe (X) about ½" to ¾" high to prevent the gasoline slopping over through the vent hole

Any ordinary case of carburetor boiling should yield to the treatment of ventilating the bowl But for those cases in hot localities a second change may be necessary Rapid radiation of heat from the manifold and carburetor body can be brought about by placing cooling fins between the manifold and carburetor flanges

Take a sheet of copper 1/16" thick and make six oval copper gaskets (G) Fig 5, 2 inches larger in diameter than the original carburetor flange gasket Punch these gaskets so that the edge of each gasket will protrude 1" beyond the carburetor flange on all sides From any good grade of thin gasket material, make 7 gaskets the same size as the original carburetor flange gasket

Assemble both sets of gaskets between the carburetor and manifold flanges so that each copper gasket is separated from the other by a thickness of gasket material The copper gaskets will then become cooling fins preventing excessive heating of the carburetor unit

OIL PRESSURE

Model and Year CHRYSLER	Min	Max
58–1925	4 lbs	22 lbs
50–1926-27	4 lbs	22 lbs
60–1926 27	5 lbs	30 lbs
70–1926-27	5 lbs	25 lbs
80–1927	5 lbs	30 lbs
80–1928	5 lbs	30 lbs
52–1927-28	4 lbs	22 lbs
62–1927-28	5 lbs	30 lbs
72–1927-28	5 lbs	30 lbs
Imperial (80)–1929	5 lbs	30 lbs
65–1929	5 lbs	30 lbs
75–1929	5 lbs	30 lbs
66–1929	5 lbs	30 lbs
77–1929	5 lbs	30 lbs
New 70–1929	5 lbs	30 lbs
Chrysler 6, 1930	25 lbs at 30 M P H	
66, 1930	25 lbs at 30 M P H	
70, 1930	25 lbs at 30 M P H	
Special 70, 1930	25 lbs at 30 M P H	
77 1930	25 lbs at 30 M P H	
Imperial, 1930	25 lbs at 30 M P H	

IGNITION TIMING

Important Note.—Ignition timing for all Chrysler motors is critical and should be timed by piston travel using a piston travel gauge

Three types of cylinder heads known as "Standard", "Silver Dome" and 'Red Head" have been used The timing procedure for all three types is the same but due to the fact that the compression ratio varies a different piston timing position is necessary for each type of head

In the following paragraphs the timing procedure for all models of Chrysler is given, followed by a table showing the correct piston timing positions for the three types of cylinder heads used Before checking the ignition timing the type of head should be determined

Timing Procedure.—Chrysler all Models 1925-30: There are no marks provided on the flywheel for ignition or valve timing To permit timing by piston travel, a drilled and tapped hole is provided directly over the center of No 6 piston on 6-cylinder motors and the spark plug hole is used on four cylinder motors This hole is tapped for ⅛" pipe thread and sealed with a ⅛" pipe plug Accurate motor timing can only be accomplished with a piston travel gauge inserted in this hole The cut (Fig 6) illustrates the type gauge most commonly used for this purpose Four cylinder

motors are timed by inserting the gauge in No 4 spark plug hole

To time the motor, remove the ⅛" pipe plug from the cylinder head and insert the piston travel gauge Scrape off the accumulation of carbon where gauge rod strikes the piston head Crank the motor and observe the travel of the gauge hand When No 4 or No 6 piston as the case may be, is at the top of its stroke The exact position of the gauge hand on the dial should be noted This point is also T D C for No 1 piston To get No 1 piston in the correct position for firing, again crank the engine until No 1 piston is approaching T D C of the compression stroke Refer to the timing table for the correct piston position and stop the piston at the exact number of thousandths of an inch before or after the top dead center position previously located on the gauge dial

With the piston in this position and the spark lever fully advanced, the contact points should just begin to separate, distributor rotor pointing to contact for No 1 spark plug wire

Care should be exercised to remove all lash from the distributor drive by exerting a pressure on the rotor against rotation The exact instant at which the points break contact, should be determined either by the use of an ammeter or light bulb in the primary circuit The ammeter on the car may be used

To Synchronize Distributors with Six Lobe Cam and Double Breaker Arms.—Set the gap of each pair of breaker points at exactly 022" Secure two cigarette papers of equal thickness and place one between each set of points, when the points are in the closed position Turn the motor slowly by tapping on the crank and at the same time exerting a steady tension on both cigarette papers If the points are properly synchronized, both papers should release at the same instant If they do not, the set of points that are mounted on the movable base should be adjusted by moving the plate forward or back until the points open simultaneously

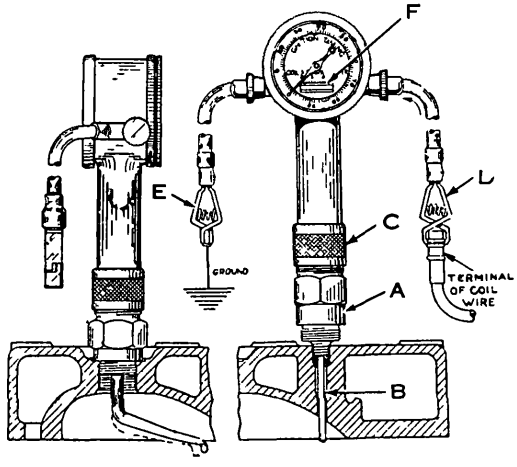


Fig 6

Piston gauge tool used in timing of all models of Chrysler automobiles On Chrysler 6 models a ⅛" pipe plug hole will be found over No 6 cylinder On 4 cylinder models use the spark plug hole

Ignition Timing Table

The following table covers ignition timing settings in thousandths of an inch piston travel for all models of Chrysler from 1925 to 1930 inclusive

Early models were equipped with Standard Heads, later models were equipped with Red Heads and the late models are equipped with Silver Dome Heads which are now standard Special ignition data for motors equipped with Silver Dome and Red Heads will be found in the notes following the table

Year	Model	Con Pt Clear	Ignition Timing: Piston Travel	Ignition Timing: Dead Center Position	Spark Lever Position	Plug Gap	Firing Order
CHRYSLER							
	58	022"	063"	B T C	Adv	030"	1-3-4-2
	50	015" 020"	063"	B T C	Adv	027" 037"	1-3-4-2
	60	022"	087"	B T C	Adv	027" 030"	1 5-3 6 2-4
	70 (early)	022"	*087"	B T C	Adv	027"	1-5 3-6 2-4
	80 (early)	022'	*010'	B T C	Adv	027" 030"	1-5 3-6 2-4
	52 (early)	022"	050"	B T C	Adv	027" 030"	1-3-4 2
	52 (late)	020"	*063"	B T C	Adv	027" 030"	1-3-4 2
	62	020"	*030"	B T C	Adv	*027" 030"	1 5 3-6 2-4
	72	022"	*067"	B T C	Adv	027" 030"	1 5 3 6 2-4
	65	020"	†010'	B T C	Adv	027" 030"	1 5 3-6 2-4
	75	022"	†067"	B T C	Adv	027" 030"	1 5 3 6-2-4
	66	020"	‡020"	B T C	Adv	*027" 030"	1 5 3 6 2-4
	77	022"	‡068"	B T C	Adv	027" 030"	1 5 3 6 2-4
	New Six	020"	‡010"	B T C	Adv	*027" 030"	1 5 3 6 2-4

Adv —Spark lever fully advanced B T C —Before top dead center

*If trouble is experienced with Chrysler Models 66, 62 and New Six 1930 cutting out on a hard pull it is recommended that the spark plug gaps be set at 022"

*Three types of cylinder heads were used on these motors from 1925 to 1930 inclusive the timing data in the table above is for motors equipped with standard cylinder heads If the motor is equipped with either a silver dome or red cylinder head, see timing information below

†Two types of cylinder heads were used on this motor The timing data in the table is for motors equipped with Silver Dome cylinder heads If the motor is equipped with a Red Head time as follows

‡This motor comes equipped with Silver Dome cylinder heads only If a Red Head installation is made time as follows

SILVER DOME HEADS

Model	Dist Point should open in thousandths inch piston travel
70 (New)	035" Before dead center
after Motor No 13000	070" " " "
80	035" " " "

RED HEADS

Model	Dist Points should open in thousandths inch piston travel
70	010" Before dead center
80	Top dead center
52	004" To top dead center
62	017" Before dead center
72	004" Before dead center
65	015" Before dead center
75	004" Before top center
66	Top dead center
77	" " "
Chrysler New Six	" " "

To Synchronize Distributors with Three Lobe Cam and Double Breaker Arms.—This type distributor is so designed that the points are connected in parallel and break contact alternately The fixed pair of arms toward the rear of the car

furnish ignition for cylinders 1-3-2, and the front (movable) set for cylinders 5-6-4. To obtain perfect motor performance it is necessary that each pair of points be accurately timed to the motor and synchronized to each other. To synchronize the points, first set the gap of each pair at exactly .022". Place the hand spark control in the full advance position. Remove the pipe plug from the cylinder head over No. 6 piston and insert the piston travel gauge. Determine from the table the exact piston position at which the points should break contact. Crank the motor until No. 1 piston is approaching T.D.C. of the compression stroke and the hand of the gauge indicates the desired piston position. Locate the distributor so that the fixed set of points just break contact and the rotor is under the terminal of the wire leading to the No. 1 spark plug.

Note: Exert a slight pressure on the side of the rotor against rotation to eliminate lash in the distributor drive when setting the timing

Crank the motor one full revolution until the piston travel gauge again registers exactly the same piston position. This brings No. 6 piston to firing position at which time the points mounted on the movable plate should just break contact. If the points do not break contact at exactly the same relative piston position, alter the adjustment of the movable base one way or the other until the desired results are obtained.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing specifications for Chrysler automobiles from 1925 to 1930 inclusive. All valve tappet adjustments are given for hot motor, and the adjustments should be made with the engine running at idling speed.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Piston Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh			
CHRYSLER								
1925	58	008"	008"	004"	006"	010" A	Opens	
1926-27	50	008"	008"	004"	006"	010" A	Opens	
1926-27	60	004"	006"	004"	006"	T D C	Opens	
1926-27	70	008"	008"	004"	006"	T D C	Opens	
1926 early 27	80	006"	008"	006"	008"	T D C	Opens	
1927-28	80	008"	010"	006"	008"	017" A	Opens	
1927-28	52	008"	008"	004"	006"	010" A	Opens	
1927-28	62	008"	008"	004"	006"	014" A	Opens	
1927-28	72	008"	008"	004"	006"	017" A	Opens	
1929	Imperial (80)	008"	008"	005"	009"	017" A	Opens	
1929	65	008"	008"	007"	007"	014" A	Opens	
1929	75	008"	008"	005"	007"	017" A	Opens	
1929	66	008"	008"	005"	007"	014" A	Opens	
1929	77	008"	008"	005"	008"	017" A	Opens	
1929	New 70	008"	008"	005"	007"	014" A	Opens	
1930	Chrysler "6"	011"	012"	005"	007"	014" A	Opens	
1930	66	007"	007"	005"	007"	014" A	Opens	
1930	70	008"	008"	005"	007"	014" A	Opens	
1930	77	008"	008"	005"	007"	017" A	Opens	
1930	Chrysler Imperl	008"	010"	006"	008"	017" A	Opens	

A —After top dead center B —Before top dead center. T D C — Top dead center

Chrysler all Models 1925-30.—No marks are provided on the flywheel for checking valve timing. Valve timing is checked by piston travel at the time of valve opening or closing. To permit timing by piston travel, a drilled and tapped hole is provided in the cylinder head directly over the center of No. 6 piston on six cylinder motors and the spark plug hole is used on four cylinder motors. This hole is tapped for ⅛" pipe thread and is sealed with a ⅛" pipe plug. Accurate checking of the valve timing can only be accomplished with a piston travel gauge, as shown in Fig. 6.

To check the valve timing, remove the ⅛" pipe plug. Scrape off accumulation of carbon where gauge rod strikes the piston head. Insert the piston travel gauge and refer to the timing table to determine what tappet setting is used when checking the timing and at what point of piston travel the exhaust valve should close Set the tappets of intake and exhaust valve of No. 1 cylinder at the proper clearance. Locate the exact T.D.C. with piston gauge of No. 4, or No. 6 pistons as the case may be. Again crank the motor until the No. 1 piston is coming up on the exhaust stroke. Check the time of valve opening and closing in No. 1 cylinder as indicated by the hand on the dial of the piston gauge.

TIMING CHAIN ADJUSTMENT

Timing chain adjustment is provided on all models of Chrysler, except those having a belt driven generator. To adjust the timing chain, loosen the bolts which secure the generator to the timing chain case and the lock nut of the adjusting screw. Move the generator away from the motor by turning the adjusting screw until the chain starts to hum, and then move toward the motor until the hum stops. Tighten the support bolts and the lock-nut of the adjusting screw.

GAS LINE SCREENS

All models of Chrysler from 1925 to 1930 inclusive have two gasoline strainers in the gas line from the supply tank to the carburetor.

Models equipped with Stewart vacuum tanks have one strainer screen in the top of the vacuum tank Fig. 7 and one at the carburetor.

Models equipped with Oil-Vac fuel feed systems have one strainer at bottom of tank in top of glass bowl and one screen located at carburetor.

On models equipped with fuel pump the gasoline strainer at the pump consists of two screens in the top of the sediment bowl Fig. 8.

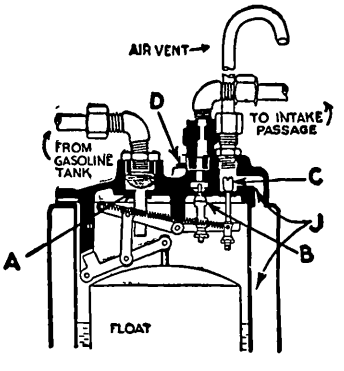


Fig 7

Upper half of vacuum tank showing location of gas line screens On models equipped with Oil-Vac fuel feed system, a strainer will be found at the bottom of the tank in top of glass bowl.

Another strainer is located at the bowl of the carburetor.

To clean the strainers in the top of the sediment bowl of the fuel pump, remove the glass bowl and wash screens with air and gasoline.

All strainer screens should be washed in gasoline and blown out with air. Never put a strainer screen back without first thoroughly cleaning the strainer body.

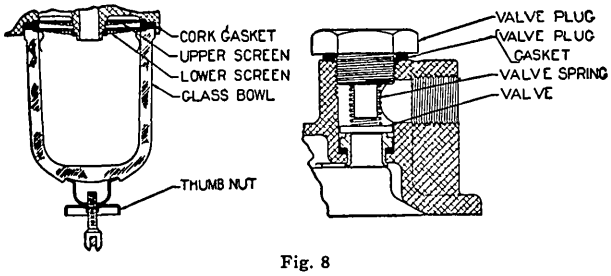


Fig. 8

Sectional view of fuel pump sediment bowl and valve showing the location of the strainer screen in the top of the bowl Remove glass bowl to clean.

Carburetor Specifications

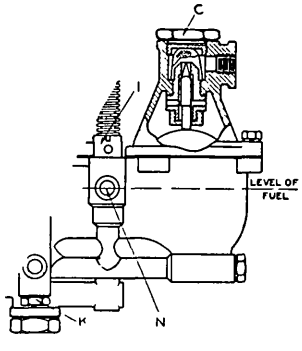
FLOAT LEVEL

Ball and Ball Carburetors

The float chamber contains only two moving parts: a short needle valve and a light spherical float acting directly upon this valve and maintaining a constant gasoline level in the bowl. Neither are adjustable, consequently the only possible trouble is damaged or worn parts or a leaky float.

Fig 9

Cutaway section of Ball and Ball carburetor showing ball float and needle valve assembly. This carburetor was used on Chrysler. Note that to clean gas line screens, remove hexagon nut (C) and the gas line screens can then be removed, washed out with gasoline and blown out with air.



The level of the gasoline may be observed by removing the step-up metering screw (1) Fig. 9. With the engine running, the level in the well should stand within 1/16" from the top of the horizontal passage (N).

Carter Carburetors

Carter Carburetor Model RAJHO.—This carburetor was used on Chrysler Model 50 in 1926. The correct float level is obtained when the top of the float is 3/4" from the milled flange of the carburetor body with the float in closed position. Float level may be changed by slightly bending float lever arm Fig. 10. Measurements should be taken with the float valve closed.

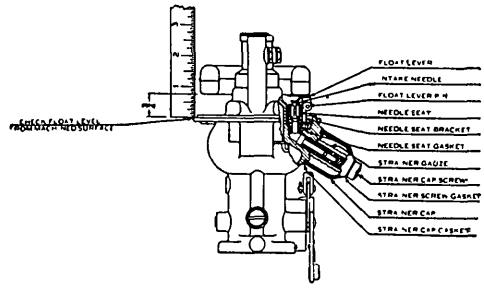


Fig 10

Sectional view of Carter carburetor Model RAJHO showing how carburetor float level should be measured.

Carter Carburetor Model RJHO8.—This carburetor was used on Chrysler Model 52 in 1927 and 1928. The correct float level is obtained when the top surface of the float is set at 5/8" from the machined flange of the carburetor body. The method of measurement is shown in Fig. 11. Measurements should be taken with the float valve closed.

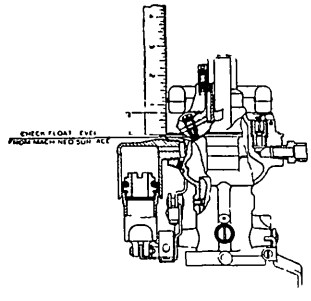


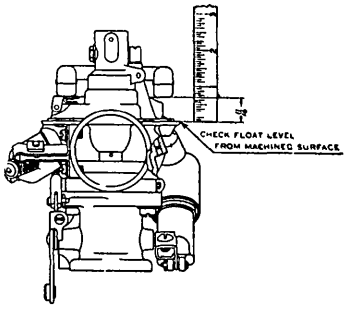
Fig 11

Sectional view of Carter carburetor Model RJHO8 showing how carburetor float level should be measured.

Carter Carburetor Model RTO-8.—This carburetor is used on the new Chrysler Six 1930. The float level adjustment is correct when the top of the float measures 11/16" from the machined surface of the carburetor body at the top of the bowl, Fig. 12. Float measurement should be taken with float valve closed.

Fig. 12

Sectional view of Carter carburetor Model RTO8 showing how carburetor float level should be measured.



Stewart Carburetors

The Stewart carburetor was used on Chrysler 58 in 1925. On all models of Stewart carburetors, the float level is set at the factory and should never need changing. In case the float valve mechanism is worn or damaged, it should be replaced. Worn float valve counterweights may cause a leak and should be replaced.

Stromberg Carburetors

Effect of Fuel on Float Level.—When Stromberg carburetors are shipped from Chicago factory, they are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé, when higher test (lower specific gravity) 68° to 70° Baumé fuel is used, the float level rises and by bending the float arm as indicated, Fig. 12A, the gasoline level is brought back to normal.

The following table for high and low test gasoline contains the correct float level heights.

Table

The following dimensions are given in terms of A, A' and B as shown in Fig. 12A. The letter (A) indicates the correct setting for low test fuels and the letter (A') indicates the correct setting for high test fuels. The letter (B) indicates the corresponding fuel level in the bowl.

Low Test Fuel			High Test Fuel		
Stromberg Type	A	B	Stromberg Type	A'	B
UU–2	7/32″	3/4″	UU–2	17/64″	3/4″
U–1	11/64″	9/16″	U–1	7/32″	9/16″
U–2–3	3/64″	9/16″	U–2–3	3/32″	9/16″
UX–2–3	3/64″	9/16″	UX–2–3	3/32″	9/16″
U&UX–4	3/64″	1 9/32″	U&UX–4	3/32″	1 9/32″
UT–1–2–3	3/64″	9/16″	UT–1–2–3	3/32″	9/16″
UT–4–5	3/64″	1 9/32″	UT–4–5	3/32″	1 9/32″
DX–1–2	31/64″	7/8″	DX–1–2	17/32″	7/8″
DX–3–4	23/64″	7/8″	DX–3–4	13/32″	7/8″
DD–2–3	11/32″	7/8″	DD–2–3	25/64″	7/8″

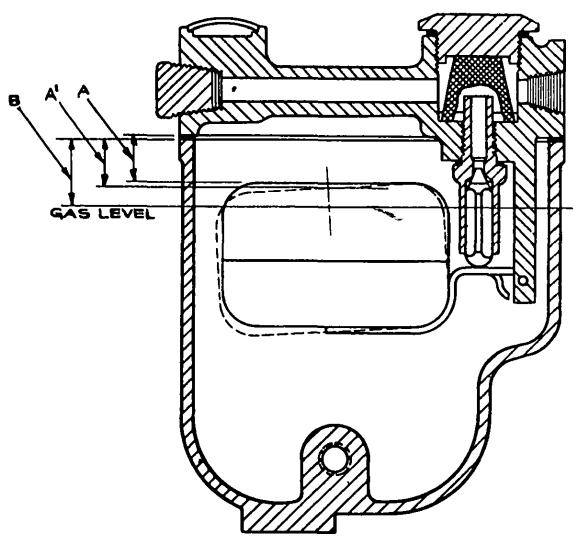


Fig. 12A

Cross section of Stromberg carburetor bowl showing variation of gas levels for low test and high test fuels. See table above for exact specifications.

Stromberg Model OE.—This carburetor was used on Chrysler Model 60 in 1926 and 1927. A small plug is located in the side of the float chamber to permit inspection of the fuel level in the bowl. The gasoline level in the bowl should stand even with the lower edge of the hole.

To adjust the float level, remove the nut in the center of the bowl cover. Loosen the lock nut and screw the needle valve up or down as the case may be.

Stromberg Model OX.—This model of carburetor was used on Chrysler from 1926 to 1928. A small plug is located in the side of the float chamber to permit inspection of the fuel level in the bowl.

The gasoline level in the bowl should stand even with the lower edge of the hole.

To adjust the float level, remove the nut in the center of the bowl cover. Loosen the lock nut and screw the needle valve up or down as the case may be.

Stromberg Model T.—This model Stromberg was used on Chrysler Model 62 in 1927 and 1928. A small plug is located in the side of the float chamber to permit inspection of the fuel level in the bowl. The gasoline level should stand even with the lower edge of the hole.

The float level may be changed by bending the lever arm in the corner between where it touches the float needle and where it meets the float body.

From the top of the float to the bottom surface of the float chamber cover, should measure 7/32″ when the needle valve is seated.

Stromberg Model U.—This model of Stromberg was used on Chrysler cars in 1928, 1929 and 1930. The gasoline level should stand at 9/16″ below the top of the float bowl.

Readjustment may be made by bending the float lever arm in the corner between where it touches the float needle and where it meets the float body.

From the top of the float at the center to the lower gasket surface of the cover should measure 3/64″ with the needle seating for Model U-2, U-3, UX-2 and UX-3. For Model U-1 this measurement should be 11/64″.

If it should become necessary to change the float level it should be borne in mind that the float should be bent up or down as the case may be exactly the same distance that it is desired to raise or lower the liquid. That is, to raise the gasoline level 1/16″ bend the float up 1/16″; to lower the gasoline level 1/16″ bend the float down 1/16″.

Stromberg UX-4.—This model of carburetor was used on Chrysler Model 80 in 1927-28-29-30. A small plug is located in the side of the float chamber to permit inspection of the fuel level in the bowl. The gasoline level in the bowl should stand even with the lower edge of this hole when the engine is running.

If it should become necessary to readjust the float level height, bend the float lever arm in the corner between where it touches the float needle and where it meets the float body. If level is low, bend arm so as to move float upward toward float chamber cover. If level is high bend float down. To raise the gasoline level 1/16″ bend the float up 1/16″. To lower the level 1/16″ bend the float down 1/16″. That is, the change in fuel level is in direct ratio to the change in float height.

Stromberg Model DX.—This model of Stromberg is used on Chrysler 1929 and 1930 models. The gasoline level should stand at 7/8″ below the top milled portion of the float bowl. The distance from the top of the float at the center to the lower gasket

face of the cover should measure 23/64" as shown at No. 25 Fig. 41.

Readjustment may be made by bending the float lever arm in the corner between where it touches the float needle and where it meets the float body.

CARBURETOR SPECIFICATION DIAGNOSIS

Carburetor Specification Information.—Chrysler automobiles have come equipped with four different makes of carburetors from 1925 to 1930 inclusive. See motor specifications under carburetor adjustment.

The jet specification information for each make of carburetor used on Chrysler is given in the following paragraphs under the heading of the carburetor. Instructions on how to use the specifications and determine the correct carburetor calibration is also given under the carburetor heading for each carburetor.

Jet Measurement.—All jet and nozzle measurements for all makes of carburetors used on Chrysler cars are given either in wire drill size, metric drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch and metric drill sizes is given below.

Drill Sizes

The following table contains twist drill and steel wire gauge sizes and areas, together with nearest equivalent metric sizes.

Drill No	Dia In	Area Sq In	Nearest Metric Size MM	Dia In	Area Sq In	Drill No	Dia In	Area Sq In	Nearest Metric Size MM	Dia In	Area, Sq In
1	2280	04082	5 8	2298	04093	41	0960	.00723	2 45	0965	00731
2	2210	03835	5 6	2205	03819	42	0935	00686	2 35	0925	00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	0866	00589
5	2055	03316	5 2	2047	03291	45	0820	00528	2 10	0827	00537
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	0807	00512
7	2010	03173	5 1	2008	03167	47	0785	00483	2 00	0787	00486
8	1990	03110	5 1	2008	03167	48	0760	00453	1 95	0768	00463
9	1960	03017	5 0	1967	03039	49	0730	00418	1 85	0728	00416
10	1935	02942	4 9	1929	02918	50	0700	00384	1 80	0709	00395
11	1910	02865	4 9	1929	02918	51	0670	00352	1 70	0669	00352
12	1890	02805	4 8	1890	02805	52	0635	00316	1 60	0630	00312
13	1850	02688	4 7	1850	02688	53	0595	00278	1 50	0591	00274
14	1820	02601	4 6	1811	02576	54	0550	00237	1 40	0551	00238
15	1800	02544	4 6	1811	02576	55	0520	00212	1 30	0512	00206
16	1770	02460	4 5	1772	02456	56	0465	00169	1 20	0472	00175
17	1730	02350	4 4	1732	02356	57	0430	00145	1 10	0433	00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	1660	02164	4 2	1654	02149	59	0410	00132	1 05	0413	00134
20	1610	02035	4 1	1614	02046	60	0400	00125	1 00	0394	00122
21	1590	01985	4 0	1575	01948	61	0390	00119	1 00	0394	00122
22	1570	01936	4 0	1575	01948	62	0380	00113	95	0374	00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	00110
24	1520	01814	3 9	1535	01851	64	0360	00101	90	0354	00098
25	1495	01755	3 8	1496	01758	65	0350	00096	90	0354	00098
26	1470	01697	3 7	1457	01667	66	0330	00085	85	0335	00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01432	3 5	1378	01491	69	0292	00067	75	0295	00068
30	1285	01296	3 3	1299	01325	70	0280	00061	70	0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0256	00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	0256	00051
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00034	55	0217	00037
36	1065	00890	2 7	1063	00887	76	0200	00031	50	0197	00030
37	1040	00849	2 6	1024	00824	77	0180	00025	45	0177	00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00015
40	0980	00754	2 5	0984	00760	80	0135	00014	35	0138	00015

BALL AND BALL CARBURETORS

The jet specification information for all models of Chrysler equipped with Ball and Ball carburetors is arranged in tables below by carburetor model rather than by car model. To find the jet specification information for any particular model of Chrysler determine the model of carburetor by either referring to the table of "Motor Specifications" under Carburetor Adjustment or by examining the name plate of the carburetor. Next refer to the tables below as described in the paragraph "How to Determine Jet Size."

Model DB Nozzle Vent.—On all Ball and Ball carburetor Models DB-20, DB-21 and DB-22 the size of the nozzle vent (A) Fig. 13 should never be changed under any consideration. This part is correctly balanced to the proper performance of the carburetor at the factory and will take care of any nozzle changes through the full range of adjustment of the carburetor.

If the nozzle (B) has been removed for any reason be sure that it sets squarely under the nozzle vent when screwed back into place. In the event that the nozzle is bent to one side or the other, a decided flat spot will be developed on acceleration. This can only be corrected by setting the nozzle so that it is square and centered under the nozzle vent. The nozzle extends into the vent for a short distance and can be seen from the top by removing the upper half of the carburetor body as shown in Fig. 13.

There is approximately 1/64" clearance as shown at (C) on all sides between the nozzle and nozzle vent when the nozzle is screwed into place.

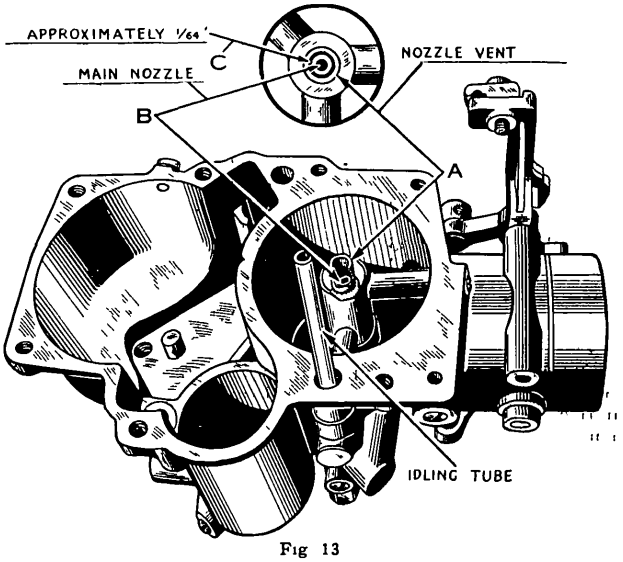


Fig 13

Top view of lower half of Ball and Ball Model DB-22 carburetor used on Chrysler automobiles. Note the position of the main discharge nozzle (B) in the nozzle vent (A). When the main discharge nozzle is screwed into place it should stand squarely in the center of the nozzle vent with approximately 1/64" clearance on all sides.

How to Determine Jet Size.—For all models of Ball and Ball carburetor, the factory has provided jets of various sizes to accommodate all conditions

of adjustment and under no consideration should jets be plugged up or drilled out. In service, carburetors will be encountered where mechanics unfamiliar with correct adjustment procedure have plugged up or drilled out first stage and metering jets. When a car comes in that will not perform properly and the trouble has been traced to the carburetor, it is well to check these jets first.

In order to enable the mechanic to determine whether a jet is of the correct size, a table containing the jet number and corresponding metric drill size for all jets is given below. Each jet used in a Ball and Ball carburetor has the number of the jet stamped on the head of the screw. This number refers to the diameter of the metering orifice in hundredths of a millimeter. Larger numbers meaning riched mixtures and smaller numbers meaning leaner mixtures.

To use the table of drill specifications first find the jet size by either referring to the tables of "Jet Specifications" below or by inspecting the heads of the jet screws in the carburetor. The metric drill size for any particular jet size will be found in the table of drill specifications below.

Primary jets are supplied in steps of .05 MM and one intermediate size, i.e. 90, 92, 95, etc.

Second stage, step up and idling fuel jets are supplied in steps of .05 MM only; that is, 90, 95, 100, etc.

Drill Specifications

(Ball and Ball all Models)

The following table contains the corresponding metric drill size of all jets used in Ball and Ball carburetors by jet and drill numbers. Each jet used in Ball and Ball carburetors has the number of the jet stamped on the head of the screw.

Jet Size	Corresponding Metric Drill Size	Jet Size	Corresponding Metric Drill Size
65	71	102	60
70	70	105	59
75	69	107	58
80	68	110	57
83	67	120	56
85	66	130	55
90	65	140	54
92	64	150	53
95	63	160	52
97	62	170	51
100	61		

Jet Specification Table

(Ball and Ball S-1 and SV Models)

The following table contains the standard specifications for Ball and Ball carburetors used on Chrysler cars. The metric drill size of any particular jet can be determined from the table of drill sizes above.

Carb. Model	Primary Jet Size	2nd Stage Jet Size	Step-Up Jet Size	Idling Fuel Jet	2nd Stage Throat
S-1	115			60	.....
SV-26	*105	†110	95	70	. . .
SV-35	100	130	95	60	28
SV-37	105	130	95	60	28

*Carburetors numbered serially below 4572 require a #105 primary metering screw. On all others the setting is #95. In all cases an extra primary metering screw larger than standard is provided but should be used only in cold climates.

†Two second stage combinations have been used in this carburetor. The first consists of a brass #26 throat (C-654) a single vent bracket assembly (C-3013, C-892, C-657) and #125 second stage metering screw. The second combination is made up of a #24 (C-654) throat, the same single vent bracket assembly and #115 second stage metering screw.

Jet Specification Table

(Ball and Ball DB Models)

The following table contains the standard specifications for Ball and Ball Model DB carburetor used on Chrysler cars The metric drill size of any particular jet can be determined from the table of drill sizes above

Carb Model	Nozzle Size	Primary Metering Screw Jet	Pump Discharge Jet	2nd Stage Metering Screw Jet	Idle Discharge Jet
DB-20	*100	95	*85	160	† 70
DB-21	100	95	85	145	† 70
DB-22	115	110	115	160	†110

*In some cases a slightly leaner setting may increase economy by reducing the pump discharge jet and main nozzle to size #80

†In early models DB carburetors the idle tube is independent of the idle discharge jet and is screwed up into the idle tube channel, while in later models the idle tube is screwed into the discharge jet (K) Fig 26 In both types of carburetors a metering orifice will be found at the upper end of the idle tube This should not be confused with the idle discharge jet in the hexagon metering screw (K) Fig 26

CARTER CARBURETORS

The jet specifications for all models of Chrysler equipped with Carter carburetors is arranged in tables below by carburetor model rather than car model. To find the jet specification information for any particular model of Chrysler determine the model of carburetor by either referring to the table of Motor Specifications under Carburetor Adjustment or by examining the name plate of the carburetor.

In service, carburetors will be encountered where mechanics unfamiliar with correct adjustment procedure have plugged up or drilled out jets. By referring to the tables of specifications below, the mechanic will be able to check all jet sizes. On page 71 will be found a table of drill sizes under jet measurements.

Carter Model RAJHO.—This model of Carter carburetor was used on Chrysler Models 50 and 52 in 1927. The following are the complete carburetor specifications.

Make of Engine: Chrysler. No. of cylinders: 4. Four cycle.

Carburetor Model: RAJH-0. Size: 1 inch. Finish: Rustproofed body, brass bowl.

Size Main Venturi: ⅞ inch. Lower well diameter: ½ inch. Upper well depth from standpipe seat: ⅜ inch.

Standpipe: Round nose top: I. D. 5/16 inch; four No. 33 air holes.

Low Speed Jet: No. 70 drill. By-pass: No. 53 drill. Economizer: No. 53 drill.

Float Level: Top of float to be ¾ inch from machined surface of casting at point opposite needle. With this setting float will not set perfectly level. Section of float attached to lever will measure slightly less than ¾ inch, which is correct.

Idle Port Opening Above Valve With Valve Tight Closed: .022 inch to .026 inch. (Chrysler 50, .021" to .027".)

Idle Port Length: .176 inch. Width: .040 inch.

Type of Idle: Air bleed. Auxiliary air bleed: No. 30 drill, plus and minus .001".

Main Well Jet: No. 69 drill. (Chrysler 50, No. 66 drill). Auxiliary jet: No. 60 drill.

Nozzle: Diagonal jet: None. Vertical jet· No. 57 drill. Top jet: No. 38 drill.

	Number	Drill Size	Distance from Top of Tube
ACCELERATING JETS (Combination No 45)	2	65	7/16 inch
	2	65	11/16 inch
	4	65	1/4 inch
	1	38	7/8 inch

Throttle Lever. Location Left side Type Stamped steel Length of lever 1¼ inch In center of travel Lever points up

To Close Throttle Move lever from you

Choker· Location In venturi Type Cone Choker lever on left side In open position, points down To close choker, move lever from you

Tube Support Bracket: Stamped steel, on air intake

Gasoline Intake Needle. Square vertical Needle seat Standard vertical

Gasoline Line: Size ¼ inch Type of connection Compression

Strainer Cap: Angled Points from you

Remarks: Recommended setting for idle adjustment screw One to one and three-quarter turns open To make mixture richer Turn adjustment screw in Do not idle engine below 250 R P M with spark retarded

Carter Model RTO8.—This model of Carter carburetor is used on Chrysler New Six 1930 The following are the complete carburetor specifications

Make of Engine: Chrysler No cylinders 6 Four cycle Bore 3⅛ inch Stroke 4¼ inch

Carburetor Model: RTO8 Size 1⅛ inch Body finish Duco or equivalent Brass bowl

Size of Main Venturi: 1 1/16 inch Upper well depth from standpipe seat ¼ inch Lower well, diameter 11/32 inch

Standpipe: Flare top 7/16 I D with 5/16 inch venturi One No 49 air hole in base Two air slots 250 to 254 inch high by 380 to 385 inch wide Two No 42 cross holes ⅜ inch from top

Low Speed Jet· No 70 drill By-pass No 54 drill Economizer No 54 drill

Float Level: Top of float to be 11/16 inch from machined surface of casting, opposite needle seat

Accelerating Pump: Type Low pressure Stroke Summer setting 9/32 inch approximately Winter setting 39/64 inch approximately Discharge jet size No 76 drill Type Ball check Feed to ball check size No 45 drill

Inside Vent: No 50 drill Outside vent None

Idle Port Opening Above Valve With Valve Tight Closed: 34 inch to 038 inch

Idle Port: Length 176 inch Width 030 inch No 56 drill at top

Type of Idle: Air bleed

Main Well Jet: Size No 54 drill

Nozzle: Vertical No 48 drill Top No 26 drill

	Number	Drill Size	Distance from Top of Tube
ACCELERATING JETS (Combination No 70)	4	60	9/16 inch
	2	55	1 5/16 inch
	2	55	1 11/32 inch

Metering Rod: Diameter Top 070 Bottom 058 Length 4 57/64 inch

Throttle Lever: Location Left side Type Stamped steel Length of lever 1 inch In center of travel lever points up To close throttle, move lever from you

Choker: Location In venturi Type Compensating Cone Choker lever on left side In open position points down To close choker, move lever from you

Tube Support Bracket: Stamped steel On air intake.

Gasoline Intake Needle: Square vertical Needle seat Standard vertical

Gasoline Line: Size 5/16 inch Type of connection S A E

Gasoline Nipple: Straight Points straight out.

Remarks: Recommended setting for idle adjustment screw ¾ to 1¼ turns open To make mixture richer Turn adjustment screw in Do not idle engine below 300 R P M with spark retarded

Carter Model RJHO-119S.—This model of Carter carburetor was used on Chrysler Model 52 in 1928 The following are the complete carburetor specifications

Make of Engine: Chrysler No cylinders 4 Four cycle

Carburetor Model· RJHO8 Size 1⅛ inch Finish Duco body, brass bowl

Size of Main Venturi. 1 inch Upper well depth from standpipe seat ⅜ inch Lower Well Diameter 7/16 inch

Standpipe: Round nose top 7/16 inch I D , with 5/16 inch venturi One No 51 air hole Two air slots 189 to 192 high by 311 to 314 wide Two No 40 cross holes 15/32 inch from top

Low Speed Jet: No 68 drill By pass No 53 drill Economizer No 53 drill

Float Level: Top of float to be ⅝ inch from machined surface of casting

Accelerating Pump: Air bleed through plunger shaft None

Throttle Valve: Standard 10 degree with one No 49 hole

Idle Port Opening Above Valve With Valve Tight Closed: 044 inch to 048 inch

Idle Port Length: 176 inch Width 040 inch

Type of Idle: Air bleed

Main Well Jet: No 65 drill Auxiliary jet None

Nozzle: Diagonal jet None Vertical jet No 60 drill. Top jet No 30 drill

	Number	Drill size	Distance from Top of Tube
ACCELERATING JETS (Combination No 60) Part No 12 106	4	58	5/8 inch
	4	58	13/16 inch
	2	58	1 1/16 inch
	2	54	1 11/32 inch

Throttle Levers Location Left side Type Stamped steel Length of lever, 1¼ inch In center of range lever points up To close throttle, move lever from you

Choker Location in venturi Type Cone Choker lever on left side In open position Points down To close choker, move lever from you

Gasoline Intake Needle: Square vertical (Part No 17-22) Needle seat Standard vertical

Gasoline Line· Size ¼ inch Type of connection S A E

Strainer Cap· Angled Points from you

Remarks: Recommended setting for idle adjustment screw Three quarters to one and one-quarter turns To make mixture richer Turn adjustment screw in Do not idle engine below 300 R P M with spark retarded

STEWART CARBURETORS

Inspection Instructions.—Stewart carburetors were used on Chrysler Models 58 1925 Very little trouble was experienced with these carburetors other than worn parts

If the carburetor is dismantled for any reason inspect as follows

1 The air valve should work freely in the air valve guide. If the valve sticks in the guide the motor will be hard to start and will not idle properly

2 See that the metering pin is not bent or loose in the rack

3 If the pinion gear is badly worn it should be replaced with a new one

4 Check for worn or leaky needle valve and seat.

STROMBERG CARBURETORS

The jet specification information for all models of Chrysler equipped with Stromberg carburetors is arranged by carburetor model rather than by car model. To find the carburetor specifications for any particular model of Chrysler, first determine the model of carburetor by either referring to the table of Motor Specifications under Carburetor Adjustment or by examining the name plate of the carburetor.

The carburetor specification information for each model of Stromberg is given under the model heading for each model of carburetor. First will be found the diagnosis information which should enable the mechanic to identify cases of trouble where the carburetor has been thrown out of balance by someone unfamiliar with the correct carburetor adjustment procedure has drilled out or soldered up jets or nozzle openings. Following the diagnosis information for each model of carburetor will be found specification tables giving the correct carburetor calibration specifications for each model of car using this model of carburetor.

All Stromberg carburetor specifications are given either in wire drill sizes or thousandths of an inch. The main metering jet and economizer bypass jet used on Stromberg U and D types are the only specifications that are given in thousandths of an inch. All other dimensions are wire drill sizes. Venturi tube measurements are given in fractions of an inch.

On page 71 under Jet Measurements a table containing twist drill and steel wire gauge sizes and areas, together with nearest equivalent metric sizes will be found.

How to Read Stromberg Model Numbers.—The first letter of a Stromberg Model designation indicates the type. The following letter indicates some special form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor, the size starting from 1″ which is No. 1 and increasing in ¼″ steps. For example, take a U type carburetor. A U-1 has a 1″ throat while a U-2 has a 1¼″ throat. The actual diameter of the carburetor opening is 3/16″ greater than the nominal rated size in accordance with the standard of the Society of Automotive Engineers.

An "X" in the model symbol indicates that the carburetor flange bolt holes are at right angles to the line of air entrance and the float chamber, the carburetor being usually installed so that the throttle shaft is parallel to the engine crankshaft and the line of the intake manifold. The letter "V" in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as "TV" or "TXV."

Specification Diagnosis
(Stromberg Model OE)

Stromberg Model OE-1.—There are six points at which the internal adjustments of a Stromberg Model OE-1 carburetor may be changed to affect its operation. These points will be considered in their proper order in the following paragraphs.

While the external carburetor design for all Model OE types used on the different models of Chrysler automobiles may be slightly changed the principle of operation and internal parts for all types are practically the same.

Idling Discharge Jets (Stromberg OE-1).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets too Large.—If the idling jets Fig. 14 are too large the motor will roll and load regardless of how much air is admitted through the idle adjustment; also the motor will have a tendency to idle fast with the throttle completely closed.

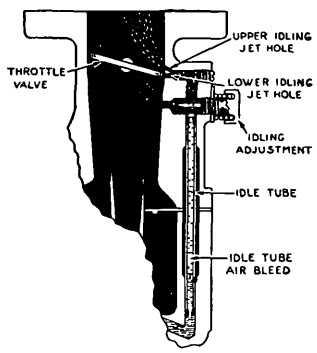


Fig. 14

Sectional view of Stromberg Model O showing how the fuel feed through the idling system is increased by passage of the throttle edge across the lower discharge opening

High Speed Adjustment (Stromberg OE-1).—The high speed adjustment will take care of all ranges within the limit of performance of the carburetor. Very little trouble will be experienced with high speed adjustment from any cause other than wear.

Diagnosis, High Speed Adjustment Parts Worn.—Wearing of the high speed adjusting needle and socket will cause a variation or irregular running of the motor at speeds above 20 miles per hour. A loss in gasoline mileage may also be noticed.

To check for worn parts turn the adjustment back and forth and if a looseness can be felt the parts are worn and should be replaced. See information under adjustment, in the Adjustment Section.

Accelerating Well Bleeder and Discharge Jet (Stromberg OE-1).—If all carburetor adjustments have been correctly made and a noticeable flat spot still exists on quick acceleration the trouble may be due to an accelerating well bleeder or discharge jet of wrong size.

Diagnosis, Well Bleed Too Large.—A well bleeder (A) Fig. 15 that is too large can be indicated by testing the car under quick acceleration on a level road. When the throttle is first opened the car will accelerate with good power for a short distance and then suddenly hesitate and may backfire.

Diagnosis, Well Bleeder too Small.—To determine whether the accelerating well bleeder is too small, test the car under quick acceleration on a level road. In the first stages of acceleration the motor will have good power but as the car approaches the desired speed a tendency to load will be noticed.

Diagnosis, Accelerating Well Discharge Jet Too Large or Too Small.—If the accelerating well dis-

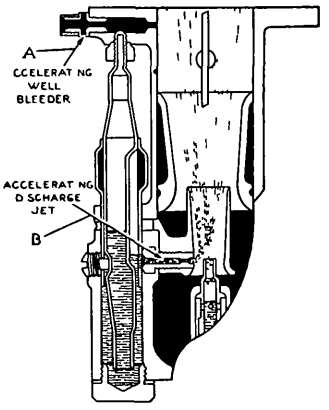


Fig 15

Sectional view of Stromberg Model O showing accelerating well and bleeder Note that the bleeder has two sizes of bleed holes for adjustment purposes

charge jet (B) Fig 15 is too small the motor will hesitate and backfire on the first stages of acceleration

If the accelerating well discharge jet is too large the motor will load from a rich mixture through the full range of acceleration providing the accelerating well bleeder is small enough to keep up the gasoline supply in the accelerating well However, if the accelerating well bleeder is of such size that the fuel is low in the well the mixture will be rich on the first stages of acceleration dropping off to a lean mixture after a short period of wide open throttle

Economizer Needle (Stromberg OE-1) —This needle will seldom give trouble unless someone has tampered with it

Diagnosis, Needle Lift Too High —If needle lift is too high the motor will have a tendency to run rough and may sputter in the carburetor at speeds above 40 miles per hour See Fig 16

Diagnosis, Needle Lift Too Low —If the needle lift is too low a condition of poor fuel economy will result The average needle lift setting is 5/16"

Main Discharge Jet (Stromberg OE-1) —It is seldom in actual practice that a large main discharge jet will have any effect on car performance other than to lower the gasoline mileage If car performance is good and the gasoline mileage is low then a smaller discharge jet may be tried

Diagnosis, Main Discharge Jet Too Small —If the main discharge jet, Fig 17, is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull

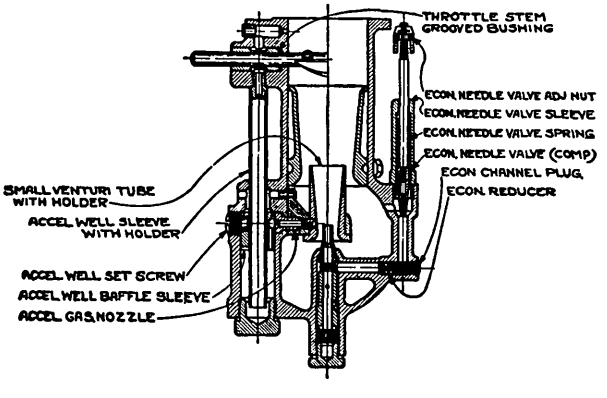


Fig 16

Cross section view Stromberg Model O carburetor showing economizer needle and accelerating well assembly

Economizer Needle Air Bleed (Stromberg OE-1) —The economizer needle air bleed and main discharge jet have been calibrated at the factory to work in perfect balance Therefore, any changes of the air bleeder should be avoided

Diagnosis, Economizer Needle Air Bleeder Too Large —If the air bleeder is too large the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration Sometimes at extreme high speed a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on

Diagnosis, Economizer Needle Air Bleeder Too Small —If the air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark The motor will be logy on acceleration and at road speeds

In most cases the trouble can be checked out by the same test procedure used for a large metering jet The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained If the air bleeder is too small, a tendency to roll and load will be noticed just as the load on the motor is lightened by car passing over the brow of the hill with the throttle still fully open

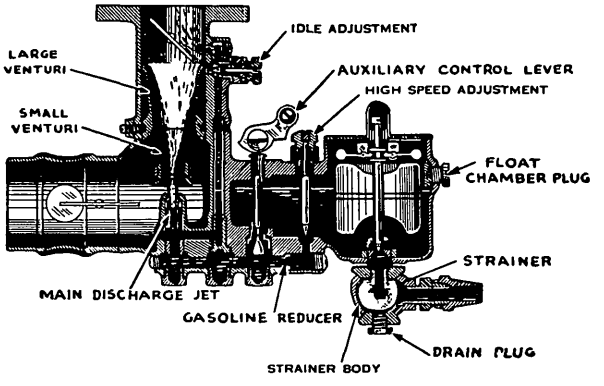


Fig 17

Diagramatic cross sectional view of Stromberg Model O carburetor showing auxiliary control lever idle adjustment and high speed adjustment

Venturi Tubes (Stromberg OE-1) —On all Model OE-1 Stromberg carburetors the venturi tubes are removable units and are held into the carburetor body by a set screw and lock nut

In practice it is seldom that trouble from a venturi of wrong size is experienced However, if this trouble is encountered, a check to see that the venturi is tight in the carburetor body should be made before testing for wrong size

Diagnosis, Venturi Too Large —If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage

Diagnosis, Venturi Too Small —If the venturi is too small the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened, with throttle still wide open, the motor will have a tendency to roll and load On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor

Specification Tables.—The following specification tables contain the carburetor specifications for each model of Chrysler using Stromberg Model OE-1:

Chrysler 60, 1926-27

(Stromberg OE-1 Engine 3" x 4¼")

Description	Wire drill Size
Idle Discharge Jets	*#56–#70
Accelerating Well Bleeder	†#28–#34
Accelerating Well Discharge Jet	#56
Economizer Needle, (with ⅜" lift)	#56
Main Discharge Jet	‡A-#40, B-#28
Venturi Tube	31/32"

*The idle jet below the throttle is #56 wire drill size; the jet above the throttle is #70 drill size.

†This is a double end bleeder having one end #28 wire drill size and other end #34 wire drill size.

‡First bore of main discharge jet is a #40 drill; second bore is a #28 drill.

Specification Diagnosis

(Stromberg Model OX)

Stromberg Model OX-2 and OX-3.—The jet specification diagnosis information for Stromberg Model OX carburetors is the same as that for Stromberg OE. See page 74 above.

The following specification tables contain the carburetor specifications for each model of Chrysler using Stromberg Models OX:

Chrysler 70, 1926-27

(Stromberg OX-2 Engine 3⅛" x 4¾")

Description	Wire drill Size
Idle Discharge Jets	*#56–#66
Accelerating Well Bleeder	†#32–#28
Accelerating Well Discharge Jet	#60
Economizer Needle (with ¼" lift)	#56
Main Discharge Jet	‡A–#42, B–#28
Venturi Tube	1 3/32"

*The idle jet below the throttle is #56 wire drill size; the jet above the throttle is #66 drill size.

†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size.

‡First bore of main discharge jet is #42 drill; second bore #28 drill.

Chrysler 80, 1927

(Stromberg OX-3 Engine 3¼" x 5")

Description	Wire drill Size
Idle Discharge Jets	*#66–#52
Accelerating Well Bleeder	†#32–#28
Accelerating Well Discharge Jet	#54
Economizer Needle (with 5/16" lift)	#56
Main Discharge Jet	‡A–#34, B|#28
Venturi Tube	1 5/16"

*The idle jet below the throttle is # 52 wire drill size; the jet above the throttle is #66 drill size.

†This is a double end bleeder having one end #32 wire drill and other end #28 wire drill.

‡First bore of main discharge jet is a #34 drill; second bore is a #28 drill.

Specification Diagnosis

(Stromberg Model T)

Stromberg Model T-1.—All Model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and the high speed air bleed, but all specifications as to principle of operation and jet diagnosis are the same as the Model O. See page 74.

High Speed Air Bleeder (Stromberg T-1).—The difference between the air bleed arrangement on Stromberg Model T and O is that the O type has the air bleed needle drilled. The T type has a separate air bleed and the needle is blank. The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeders should be avoided.

Diagnosis, Air Bleeder Too Large.—If the air bleeder is too large, the trouble may be indicated by sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speed a gentle popping in the muffler will be produced similar to the exhaust noise when coasting down a hill at a high rate of speed, with the throttle closed and the ignition switch turned on.

Diagnosis, Air Bleeder Too Small.—If the high speed air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speed.

In most cases the trouble can be indicated by the same test procedure used to determine whether a main metering jet is too large. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the air bleed is too small a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available, see level road test page 81.

Specification Table.—The following specification table contains the carburetor specifications for each model of Chrysler using Stromberg Model T-1:

Chrysler 62, 1927-28

(Stromberg T-1 Engine 3" x 4¼")

Description	Wire drill Size
Idle Discharge Jets	*#55–#70
Accelerating Well Bleeder	†#26–#30
Economizer Needle (with ⅜" lift)	Blank
High Speed Bleeder	#65
Main Discharge Jet	‡A–#34, B–#28
Venturi Tube	31/32"

*The idle jet below the throttle is #55 wire drill size; the jet above the throttle is #70 drill size.

†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.

‡First bore of main discharge jet is a #34 drill; second bore is a #28 drill.

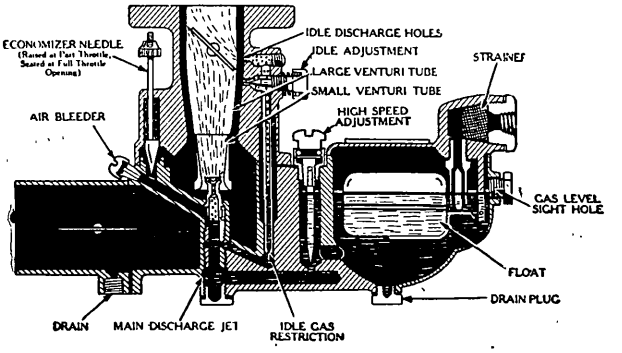


Fig. 17A.

Cross section diagramatic view of a Stromberg Model T carburetor. The Model T is very similar to the Model O with the exception that on the Model O the high speed air bleed is drilled through the economizer needle while in the Model T the high speed air bleed is a separate opening as shown in the illustration and the economizer needle is blank.

Specification Diagnosis

(Stromberg Model U)

Stromberg Model U-2.—While the external design of the different types of Stromberg Model U carburetors used on Chrysler may be slightly changed the working principle and internal parts for all types are practically the same The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments changed

Occasionally carburetor specifications will be changed by drilling out the jet openings, take for example the idling jets or the air bleeder, in many cases these openings are made in the carburetor body It is not good practice to drill out these openings since this will necessitate installing a new carburetor body in order to obtain the original correct jet size

There are seven places at which the internal adjustments of a Model U carburetor may be changed to affect its operation When attempting to determine these changes the work should be done in order as given below

Idling Discharge Jets (Stromberg U-2) —The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings

Diagnosis, Idle Jet Too Large —If the idling jets are too large the motor will roll and load regardless of how much air is admitted through the idle adjustment, also the motor will have a tendency to idle fast with the throttle completely closed

Main Metering Jet (Stromberg U-2) —The metering jet or high speed adjustment Fig 18 controls the flow of gasoline for speeds above 20 miles per hour This jet may be either of the fixed size or adjustable type

Diagnosis, Metering Jet Too Large —To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed ten miles per hour in high gear can be maintained If the metering jet is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open If no hill is available see level road test page 81

Diagnosis, Metering Jet Too Small —If the metering jet is too small the car will have a tendency to stall on a light grade when the motor is throttled down to approximately seven or eight miles per hour and then accelerated gradually to about one fourth throttle

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of the wrong specification If after changing the metering jet to a larger or smaller size the trouble still exists or is aggravated the by-pass jet should next be checked

By-Pass Jet (Stromberg U-2) —The by-pass jet is shown as the by-pass restriction (T) Fig 19.

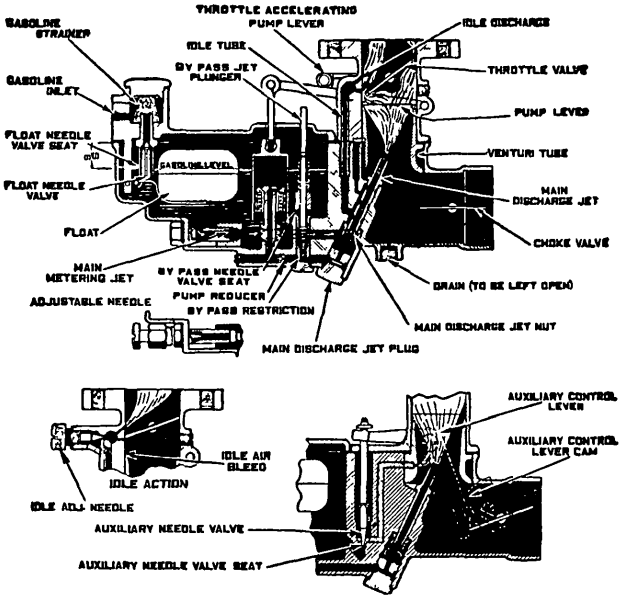


Fig 18

Cross section view of Stromberg Model U carburetor with manual controlled economizer The carburetor is supplied as equipment on Chrysler cars with a set type main metering jet However, as shown in the insert this jet may be changed to the adjustable type if necessary

The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle

Three conditions of trouble may be encountered in connection with the by-pass jet, namely the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small

Diagnosis, By-Pass Jet Too Large —If the by-pass jet, (T) Fig 19, is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour To check for this condition the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed ten miles per hour in high gear can be maintained If the by pass is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open If no hill is available see level road test page 81

Diagnosis, By-Pass Valve Sticking —The by-pass valve may stick or not seat properly due to wear or warp If this condition exists the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage This trouble may also make a correct carburetor adjustment difficult

Diagnosis, By-Pass Jet Too Small —If by pass jet is too small the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition

To check try the car out on a hill steep enough to require a full open throttle Depending upon the individual characteristics of the car a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where, when the throttle is fully opened the car will have a decided flat spot but as the throttle is partially closed the motor will pick up

A tendency to poor acceleration will prevail under all conditions

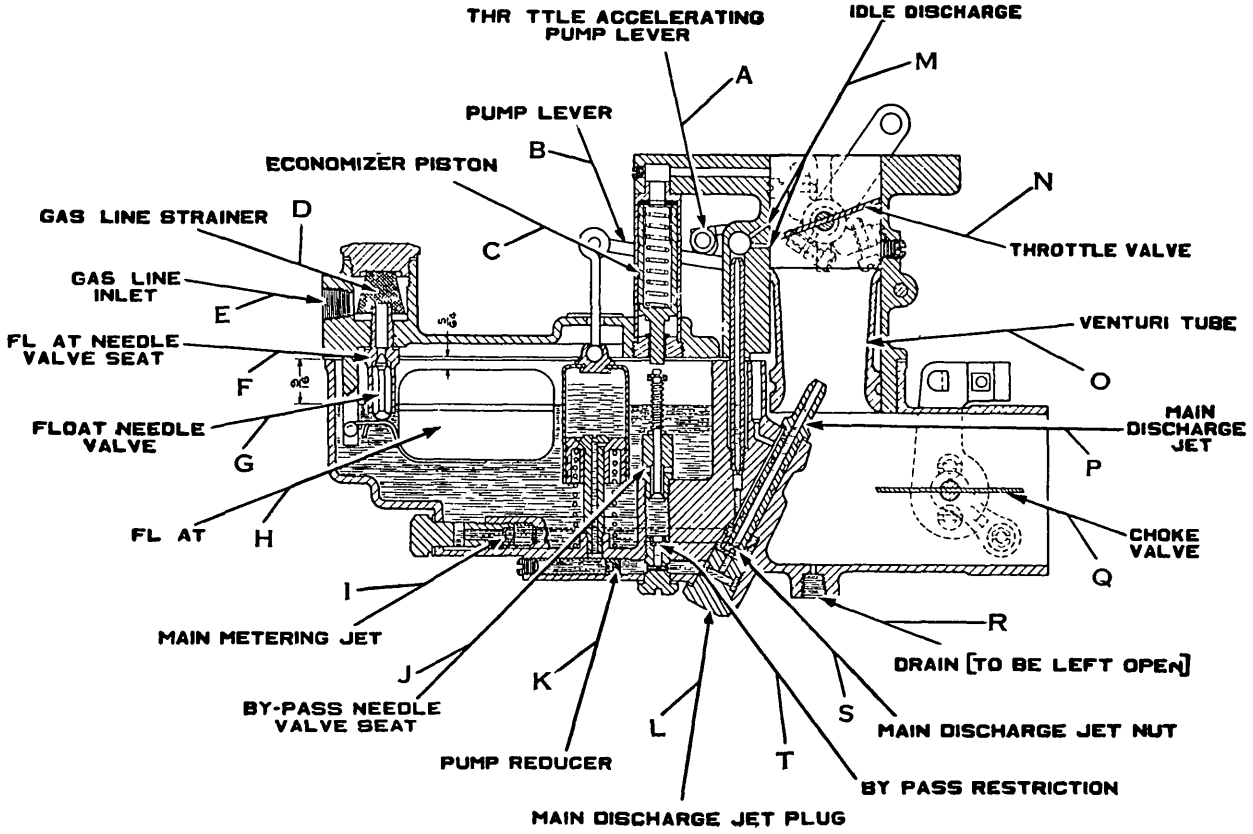


Fig. 19

Cross section view of Stromberg Model U carburetor with vacuum economizer. As shown in the section the main metering jet (I) is of the set type. However, if necessary, this jet may be changed to the adjustable type.

Main Discharge Jet (Stromberg U-2).—It is seldom in actual practice that a large main discharge jet, Fig. 19, will have any affect on car performance other than to lower the gasoline mileage. This condition holds true, however, within a certain limit. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. In these cases reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and roll at higher speeds the trouble will probably be caused by a main discharge jet that is too large. This trouble should not be confused with a venturi that is too small. See information below for small venturi.

Diagnosis, Main Discharge Jet Too Small.—If the main discharge jet, Fig. 19, is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

High Speed Air Bleeder (Stromberg U-2).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore, any changes of the air bleeder should be avoided.

Diagnosis, Air Bleeder Too Large.—If the air bleeder is too large the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder Too Small.—If the high speed air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available see level road test page 81.

Accelerating Pump (Stromberg U-2).—The pump reducer (K) Fig. 19 regulates the flow from the accelerating pump and affects the operation of the carburetor during quick acceleration.

On Model U-2 carburetors with manual controlled by-pass or economizer valve, Fig. 18, make sure that the roller of the throttle accelerating pump lever is in contact with the pump lever when the throttle is in closed position.

Diagnosis, Pump Discharge Jet Too Large or Too Small.—If the pump discharge jet is too large the motor will stumble on quick acceleration. If the jet is too small the motor will usually backfire on quick acceleration.

Venturi Tubes (Stromberg U-2).—Two types of venturi tube design are used in Stromberg Model U-2 carburetors. In one type the venturi is

cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed In practice it is seldom that trouble from a venturi of wrong size is experienced On the interchangeable types the venturi is locked into place by a set screw that may work loose Before testing for wrong venturi size see that the set screw is tight

Diagnosis, Venturi Too Large —If the venturi size is too large motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet As the car gains momentum on acceleration the motor performance will improve until at high speeds the carburetor operation may be fairly satisfactory with good gasoline mileage

Diagnosis, Venturi Too Small —If the venturi is too small the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open the motor will have a tendency to roll and load On a level stretch of road with throttle wide open the car will lack speed and gasoline mileage will be poor

Specification Table.—The following specification table contains the carburetor specifications for each Model of Chrysler using Stromberg Model U

Chrysler 62, 1928

(Stromberg U-1 Engine3⅛" x 4¼")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#56–#66
Main Metering Jet	051"	
By-Pass Jet	031"	
Main Discharge Jet		#40
High Speed Air Bleeder		#60
Pump Reducer		#64
Venturi Tube		7/8"

*The idle jet below the throttle is #56 wire drill size, the jet above the throttle is #66 wire drill size

Chrysler 65 and 66, 1929-30

(Stromberg U 2 Engine 3⅛" x 4¼")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#55|#65
Main Metering Jet	059"	
By-Pass Jet	025"	
Main Discharge Jet		#32
High Speed Air Bleeder		#58
Pump Reducer		#68
Venturi Tube		31/32"

*The idle jet below the throttle is #55 wire drill size the jet above the throttle is #65 wire drill size

Chrysler 80, 1928-29-30

(Stromberg UX 4 Engine 3⅝" x 5")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#53–#52
Main Metering Jet		
High Speed Needle Valve	Open 35 notches	
By-Pass Jet	055"	
Main Discharge Jet		†A–#34, B–#4
High Speed Air Bleeder		#60
Pump Reducer		
Accelerating Nozzle		#50
Venturi Tube		1 3/8"

*The idle jet below the throttle is #53 wire drill size the jet above the throttle is #62 wire drill size

†First bore of main discharge jet is a #34 drill, second bore is a #4 drill

Specification Diagnosis

(Stromberg Model DX)

Stromberg Model DX-3.—While the external design of the different types of Stromberg Model DX carburetors used on Chrysler cars may be slightly changed, the working principle and internal parts for all models are practically the same The following information is given to enable the

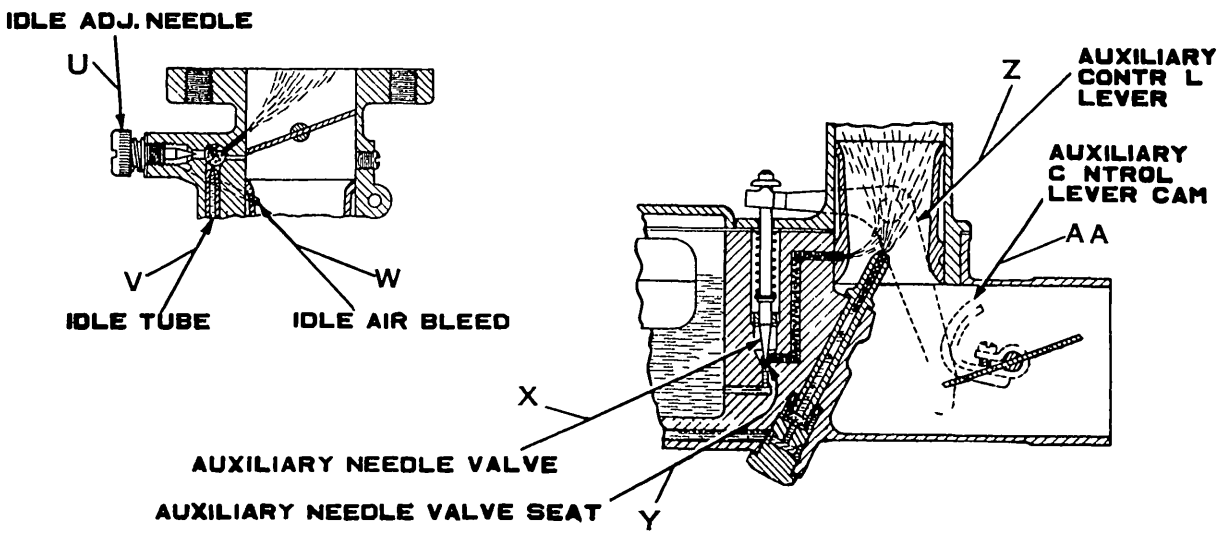


Fig 19A

Sectional views of Stromberg Model U carburetor used on Chrysler automobiles The right view shows the auxiliary needle (X) the auxiliary control lever (Z) and auxiliary control lever cam (AA) This needle is for the purpose of by passing fuel around the high speed adjustment in order to give a richer mixture for starting and during the warming up period The needle should always remain closed when the choke is in the full open position The clearance between the nut on the top of the needle and the fork which lifts the needle should be from 004" to 010"

mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments made.

Occasionally carburetor specifications will be changed by drilling out the jet openings; take for example the idling jets or the air bleeders. In many cases these openings are made in the carburetor body. It is not good practice to drill out these openings since this will necessitate installing a new carburetor body in order to obtain the original correct jet size.

There are seven places at which the internal adjustments of a Model DX carburetor may be changed to affect its operation. When attempting to determine these changes, the work is done in order as given below.

Idling Discharge Jets (Stromberg DX-3).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered, but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets Too Large.—If the idling jets are too large the motor will roll and load regardless of how much air is admitted through the idle adjustment; also, the motor will have a tendency to idle fast with the throttle completely closed.

Main Metering Jet (Stromberg DX-3).—The main metering jet or high speed adjustment (10) Fig. 41 controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet Too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the main metering jet is too large, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available see level road test page 81.

Diagnosis, Metering Jet Too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-fourth throttle.

The symptoms produced by a main metering jet of the wrong size may be confused with a by-pass jet of the wrong specification. If after changing the metering jet to a larger or smaller size the trouble still exists or is aggravated, the by-pass jet should next be checked.

Economizer By-Pass Jet (Stromberg DX-3).—The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet, namely, the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet Too Large.—If the by-pass jet is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available see level road test page 81.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult.

Diagnosis, By-Pass Jet Too Small.—If the by-pass jet is too small the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where, when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up.

A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jet (Stromberg DX-3).—The main discharge jet on all Stromberg Model DX carburetors are not changeable. By this is meant that the nozzle or jet is not changeable so far as specifications are concerned and under no consideration should these jets be drilled out or changed.

High Speed Air Bleeder (Stromberg DX-3).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeder should be avoided as far as possible.

Diagnosis, Air Bleeder too large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder to Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to the condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In most cases, the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle, a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. Before making the hill test as described above, the car should be tried out under level road conditions. See level road test page 81.

Accelerating Pumps (Stromberg DX-3).—Accelerating pumps on all Model DX carburetors are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of the screw (6) Fig. 41.

A condition may prevail whereby the pump stroke adjustment is so close that it is difficult to determine whether the stroke is too long or too short In these cases if shortening the pump stroke improves the motor performance, the stroke was too long But, if the stroke is too short, then shortening the stroke will aggravate the condition See diagnosis below

Diagnosis, Pump Stroke too Short —If the pump stroke is too short, the car owner may complain that the motor hesitates and stumbles accompanied by sputtering in the carburetor This condition may also cause the motor to die in traffic on deceleration after a quick acceleration

To check, first try the car on the service floor by accelerating the motor from idle to high speed several times, always dropping back to idle for at least 10 seconds, each time after speeding up the motor The object of this test is to get the motor to sputter in the carburetor The pump stroke setting may be so close that the motor may not sputter for several trials

If adjustment is so close that the motor will not sputter, try shortening the stroke until the motor does sputter (If the pump stroke happens to be too long, shortening will improve the motor performance) After the test is completed, lengthen the pump stroke until the motor smooths out

Important: After adjustment of the pump stroke is completed, check the car out on a level road for proper accelerating performance

Diagnosis, Pump Stroke too Long —If the pump stroke is too long, the car owner may complain that on acceleration the motor will hesitate and roll, accompanied by an unpleasant jerking followed by the motor smoothing out

To check, first test the car on the service floor On quick acceleration, the motor will have a tendency to stumble and roll and on deceleration the motor may run rich for 10 or 15 seconds and even die

On a road test, the motor will stumble and hesitate on accceleration and then run rich for from 40 to 50 feet To correct, shorten the pump stroke

Venturi Tubes (Stromberg DX-3) —All venturi tubes on Stromberg Model DX carburetors are removable and are held into the carburetor body by a set screw and lock nut In practice it is seldom that trouble from a venturi tube of wrong size is experienced However, if this trouble is encountered, a check to see that the venturi is tight in the carburetor body should be made before testing for wrong size

Diagnosis, Venturi Tube too Large —If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet As the car gains momentum on acceleration, the motor performance will improve until at high speed, the carburetor operation may be fairly satisfactory with good gasoline mileage

Diagnosis, Venturi Tube too Small —If the venturi is too small the motor will have good power on acceleration at wide open throttle under 25 miles per hour, but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to roll and load On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor

Specification Table.—The following specification table contains the carburetor specifications for each Model of Chrysler using Stromberg Model DX.

Chrysler 70, 1929-30

(Stromberg DX 3 Engine 3⅛" x 4¾")

The following specifications are contained in the Stromberg Bulletin #2441 dated October 17, 1929, and are subject to change without notice Watch Radco Automotive Review for latest information

Description	Size thousandths inch	Wire drill size
Idling Discharge Jets		*#55–#68
Main Metering Jet	062"	
Economizer By-Pass	040"	
Main Discharge Jet		†Part No 14483
High Speed Air Bleeder		#65
Pump Discharge		#64
Venturi Tube		1 3/16"

*The idle jet below the throttle is a #55 wire drill size, the jet above the throttle is a #68 wire drill size

†On all Stromberg Model DX carburetors the main discharge jet is not a calibration part and therefore the holes should never be drilled out or changed in service under any consideration

Chrysler 77, 1929-30

(Stromberg DX-3 Engine 3⅜" x 5")

The following specifications are contained in the latest Stromberg Bulletin #2465 dated May 15, 1930, and are subject to change without notice Watch Radco Automotive Review for latest information

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#53–#65
Main Metering Jet	062"	
Economizer By-Pass	040"	
Main Discharge Jet		†Part No 14483
High Speed Air Bleeder		#65
Pump Discharge		#64
Venturi Tube		1 3/16"

*The idle jet below the throttle is a #53 wire drill size, the jet below the throttle is a #65 wire drill size

†On all Stromberg Model DX carburetors the main discharge jet is not a calibration part and therefore the holes should never be drilled out or changed in service under any consideration

Chrysler Special 70, 1930

(Stromberg DX-3 Engine 3⅜" x 5")

The following specifications are contained in the latest Stromberg Bulletin #2465 dated May 15, 1930, and are subject to change without notice Watch Radco Automotive Review for latest information

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#53–#65
Main Metering Jet	062"	
Economizer By-Pass	040"	
Main Discharge Jet		†Part No 14483
High Speed Air Bleeder		#65
Pump Discharge Jet		#64
Venturi Tube		1 3/16"

*The idle jet below the throttle is a #53 wire drill size, the jet below the throttle is a #65 wire drill size

†On all Stromberg Model DX carburetors the main discharge jet is not a calibration part and therefore the holes should never be drilled out or changed in service under any consideration

LEVEL ROAD TESTING

The following carburetor test information is given for level localities where hills are not available The best results, when testing the carburetor, will generally be obtained on a hill test as described in the Specification Diagnosis section for each Stromberg model The following information should be used only in localities where hills are not available for testing purposes

Economizer or High Speed Air Bleeder (Stromberg OE, T, U and DX).—The high speed

or economizer air bleeder and main discharge jet have been calibrated to work in perfect balance at the factory; therefore, any change of the air bleeder should be avoided as far as possible.

Diagnosis, Air Bleeder too Small.—If the economizer or high speed air bleeder is too small, the car owner may complain of low gasoline mileage at all car speeds accompanied by a tendency in extreme cases for the motor to roll and load at low speeds and on acceleration. On a level road test with wide open throttle, the car will lack speed and power and motor performance will be similar to a condition of late ignition timing or retarded spark.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass that is too large.

In most cases the trouble can be checked out by level road test in the following way:

First replace the air bleeder with a larger size (not to exceed four sizes larger on the first test). It should be remembered, however, that on some Stromberg models, the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passage way is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next, take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved when a larger opening is used, but if no change is noticed, or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large the car owner may complain of a tendency for the motor to hesitate on slow acceleration and in some cases the motor may die in traffic. With a wide open throttle, the car will probably lack speed and power accompanied by a gentle popping in the muffler. It should be remembered that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models, the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, turn to the specification table which contains the correct drill size specifications for the particular carburetor model in question. These carburetor specifications will be found in a table at the end of each Specification Diagnosis section, for the particular carburetor model in question. After the correct air bleed wire drill size is known by referring to the table, check to see whether someone unfamiliar with the correct carburetor calibration procedure has drilled out the air bleed opening. If the air bleed opening has been drilled out, it may be necessary in order to correct the trouble, to replace the carburetor body. However, if the air bleeder is of the changeable type, a smaller air bleeder may be used.

In most cases, an air bleeder that is too large can be checked out on level road test by slowly accelerating the car to approximately 25 miles per hour with the spark half retarded. If the air bleed opening is too large from one to three flat spots will probably be experienced and in some cases accompanied by a popping back of the motor during the period of slow acceleration.

Main Metering Jet (Stromberg U and DX).—The main metering jet or high speed adjustment controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Main Metering Jet too Large.—The car owner may complain of poor gasoline mileage at all speeds with a tendency in some cases for the motor to roll and load. It may also be found that when starting a cold motor, the choke can be released immediately.

In most cases, the trouble can be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the car will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on first test) and test the car again with wide open throttle in second gear. If reducing the metering jet corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor, accompanied in most cases with a loss of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade or on a pull when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-quarter throttle.

By-Pass Jet (Stromberg U and DX).—The purpose of the by-pass jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely: the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small. In the following diagnosis, only the information for a level road test where the by-pass jet is too large will be given. Turn to the diagnosis section, pages 77 to 81, for the particular model of carburetor in question for information on a by-pass valve sticking or a by-pass jet that is too small.

Diagnosis, By-Pass Jet too Large.—The car owner may complain of poor gasoline mileage at high speed and a tendency to roll and load on a pull or any condition requiring a wide open throttle.

In most cases where no hill is available that is steep enough for a test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle conditions. When reducing the size of the by-pass jet, the following instructions are recommended. If the by-pass jet in the carburetor is over .040" try five sizes smaller. However, if the by-pass jet in the carburetor is less than .040", try two sizes smaller on first test.

Carburetor Adjustment

SPECIAL INFORMATION

Important Information.—A correct carburetor adjustment cannot be obtained on any model of Chrysler unless the motor is thoroughly warmed up. Idle the motor for at least ten minutes.

Before changing any of the carburetor adjustments, check for leaky carburetor flange and manifold gaskets and make sure that the choke valve opens and closes properly.

The carburetor adjustment information for Chrysler automobiles is arranged by carburetor make and model rather than by car model. To find

the adjustment information for any particular model of car first determine the make and model of carburetor from the table of motor specifications below and then turn to the information for that model of carburetor in the adjustment section.

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and year	Model	Engine	No. cyl.	Bore and stroke	Carb. model and size
CHRYSLER					**BALL BALL**
1926-27	50	Own	4	3 5/16"x4 1/2"	S1-1"
1926-27	70	Own	6	3 1/8"x4 3/4"	SV26M-1 1/4"
1927-28	72	Own	6	3 1/4"x5"	SV37-1 1/4"
1929	75	Own	6	3 1/4"x5"	DB-20-1 3/8"
					CARTER
1926-27	50	Own	4	3 5/16"x4 1/2"	RAJHO-1"
1927-28	52	Own	4	3 5/8"x4 1/8"	RJHO8-1"
1929	75	Own	6	3 1/4"x5"	DB-22"
					STEWART
1925	58	Own	4	3 5/8"x4 1/2"	25-1"
					STROMBERG
1926-27	60	Own	6	3 "x4 1/4"	OE-1
1926-27	70	Own	6	3 1/8"x4 3/4"	OX-2
1927	80	Own	6	3 1/2"x5"	OX-3
1928	80	Own	6	3 5/8"x5"	UX-4
1927-28	62	Own	6	3 "x4 1/4"	T-1
1929	Imperial (80)	Own	6	3 5/8"x5"	UX-4
1929	65	Own	6	3 1/8"x4 1/4"	U-2
1929	66	Own	6	3 1/8"x4 1/4"	U-2
1929	77	Own	6	3 3/8"x5"	DX-3
1929	New 70	Own	6	3 1/8"x4 3/4"	DX-3
1930	66	Own	6	3 1/8"x4 1/4"	U-2"
1930	70	Own	6	3 1/8"x4 3/4"	DX-3"
1930	Special 70	Own	6	3 3/8"x5"	DX-3"
1930	77	Own	6	3 3/8"x5"	DX-3"
1930	Imperial	Own	6	3 5/8"x5"	UX-4"

CARBURETOR FUMER

When the engine stops running a certain amount of fuel, which has condensed in the intake manifold, drains down into a well at the bottom of the carburetor. An electrical heating element, called the fumer, Fig. 23, is screwed into this well. A switch on the instrument board, when pressed, closes an electrical circuit, causing heat to be generated in the fumer. This heat vaporizes the fuel which has drained into the fumer, and when the engine is cranked the vapor is drawn into the cylinders to be ignited.

If the engine does not start after it has been turned about 3 seconds by the starter and with the choke fully closed, the fumer switch button should be pressed "in" for about 20 or 30 seconds after releasing the starting motor button, thereby generating rich fuel fumes in the carburetor and intake manifold.

The choke should be fully closed and the manifold heat control button withdrawn. Then, with the ignition switch turned "on" and the throttle opened about one-third, the starting motor button should be pressed.

If, after the starting motor has turned the engine for about 3 or 4 seconds, the engine does not start on its own power, the starting motor button should be released and the above operation repeated.

The fumer switch is to be held "in" continuously until the engine starts. As soon as the engine starts the choke should be opened slightly and the throttle closed sufficiently to avoid racing of the engine. The choke lever should be gradually moved to the vertical (open) position while the engine is warming. The "run" position should be attained as soon as the engine will fire regularly with the choke lever vertical. In extremely cold weather the fumer switch should be held "in" for a few seconds while the engine is warming up.

The fumer should not be used to start a warm engine. The nuts securing the wire terminals to the fumer switch should always be kept tight.

MANIFOLD HEAT CONTROL

The manifold heat control provides a quick means of heating the inlet manifold, thereby reducing the length of time that the choke must be used after starting a cold engine. It also makes the engine more flexible during the warming-up period, as well as reducing the fuel consumption, carbon accumulation, and crankcase dilution.

The valve for this heater Fig. 1 is operated by a knob on the instrument panel. Pulling this knob out closes the main exhaust passage and opens a manifold by-pass, thereby causing all of the exhaust gas to circulate through the inlet manifold heat jacket before going to the muffler. Pushing the knob "in" closes the by-pass and opens the exhaust passage direct to the muffler; under which condition the inlet manifold is heated by the exhaust gas principally from the two center cylinders.

When starting and warming up a cold or cool engine, the manifold heat control knob should be pulled "out" to its stop. After the engine is sufficiently warm to provide standard performance with the carburetor choke lever in the vertical or "run" position, the heat control knob should be pushed "in" to its stop.

In cold or cool weather the manifold heat control knob should be pulled "out" just long enough to provide summer-like engine performance. In warm or hot weather the manifold heat control knob should be pushed "in" to its stop.

Primarily, the manifold heat control is designed for cold weather usage. In freezing weather, full heat can be used to good advantage for city driving below 30 miles per hour. For cross-country driving at speeds of 35 miles per hour or higher, even in freezing weather, the manifold heat control knob should be pushed in all of the way; manifold heat "on" under these conditions would cause a loss of power and efficiency.

BALL AND BALL CARBURETORS

Equipment.—Ball and Ball carburetors came as equipment on Chrysler 50 1926-27, 70 1926-27-29, 72 1927-28 and 75 1929. The adjustment information for each type of Ball and Ball carburetor will be found in the following paragraphs.

Principle of Operation.—All Ball and Ball carburetors used on Chrysler automobiles are known as two stage type carburetors with the exception of the Model S-1 which is a plain tube, single stage carburetor. The Model S-1, Fig. 20, carburetor

differs from the SV type in that the second stage and step-up features are eliminated and only the primary stage in a slightly modified form is utilized.

As shown in Fig. 21 two complete carburetors are combined to work as one unit. Through a given range of throttle opening all the gas is drawn through the first stage throttle at the top. The capacity of the first stage is sufficient to take care of all level road speeds up to approximately 40 or 45 miles per hour.

The second stage is brought into action by opening the main throttle to its extreme position. When the main throttle has reached a position of approximately ¾ open the cam arm integral with the main throttle shaft comes into contact with the roller on the arm of the second stage throttle shaft, causing the second stage throttle to open. The resultant action is to draw an additional or secondary supply of gasoline mixture through the second stage nozzle.

Briefly speaking, the first stage carburetor furnishes fuel for what might be termed the touring range giving ample power for all ordinary purposes up to 40 or 45 miles per hour. The second stage carburetor supplies additional fuel for all requirements above the first stage in the form of added acceleration, power and speed.

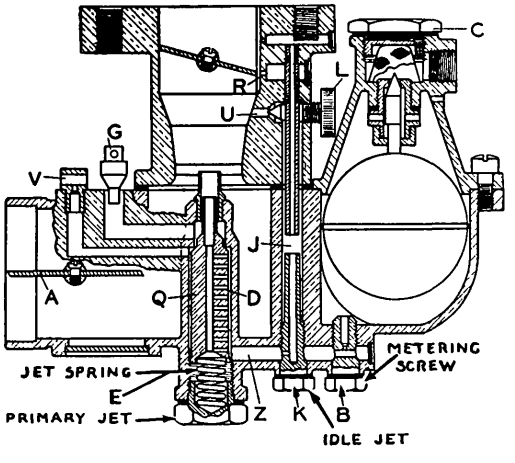


Fig. 20

Cross section view of Ball and Ball carburetor Model S-1B. The main jet spring (E) holds the jet rigidly up in place as shown. In service, this spring may get weak allowing the jet to sag or drop away from the nozzle vent thus causing a sluggish motor and poor carburetor performance in general. Correct by replacing the spring, or in cases of emergency, washers may be placed under the spring

BALL AND BALL MODEL S-1

Idle Adjustment.—The idle mixture and closed throttle running are controlled by the idle adjustment screw (B) Fig. 22. This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw as above described the

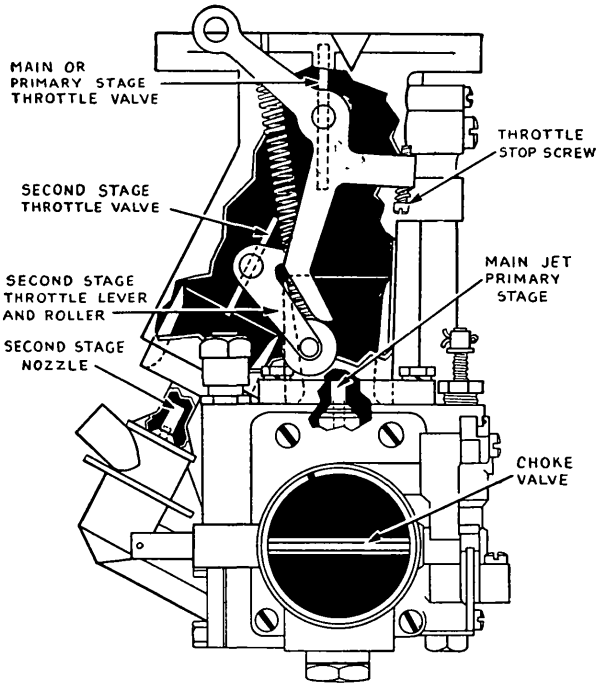

MAIN OR PRIMARY STAGE THROTTLE VALVE
THROTTLE STOP SCREW
SECOND STAGE THROTTLE VALVE
MAIN JET PRIMARY STAGE
SECOND STAGE THROTTLE LEVER AND ROLLER
SECOND STAGE NOZZLE
CHOKE VALVE

Fig. 21

Cutaway section of Ball and Ball two stage carburetor showing the arrangement of the jet and throttle valve assemblies for both the first and second stage units The second stage unit does not come into operation until the main throttle is approximately three-fourths open.

engine idles too fast, the throttle stop screw (A) should be turned anti-clockwise. These are the only adjustments provided on the carburetor.

Choke.—The choke lever (H) Fig. 22 controls the operation of an auxiliary air valve (G). When the choke control button on the instrument panel is withdrawn about ½" the choke lever (H) raises and permits the valve (G) to close, which shuts off the auxiliary air supply. This valve (G) should only be closed while the engine is being started cold and during the warming-up period. As soon as the engine has become warm enough to run evenly, the choke button on the instrument panel should be pushed "in" to its stop.

The choke control wire is held in place on the choke lever by means of the screw (J) and it is recommended that the disc in the choke valve be inspected occasionally to make certain that it closes fully when the choke control button is withdrawn from the instrument panel and that it opens fully when the choke control button is pushed "in" to its stop.

Important: The valve (G) must be fully opened when the choke control button is pushed "in" to its stop.

Float.—The float is a hollow metal ball contained in the float chamber. As fuel is admitted to the carburetor, the float raises and touches a plunger, in a vertical position, which shuts off the supply of fuel as soon as it reaches the proper level. Too rich a mixture at all speeds, except idling,

usually indicates a heavy float which is only caused by fuel being admitted inside the float. This is caused by a leak in the float and, if it is desired to determine whether or not the float leaks, the screws (D) should be removed and the cap lifted off the float chamber. The float can then be lifted out readily. Shaking the float will cause the fuel, if any, to splash around in the float which can easily be heard if held close to one's ear.

To Clean Carburetor.—A strainer is attached to the underside of the plug (C, Fig. 22) and should be removed once every two or three months and thoroughly cleaned. It is advisable to remove the fuel metering screw (E) at the same time so as to drain out any sediment or water which may form in the bottom of the float chamber. If turning the idle adjustment screw (B) does not affect the idle

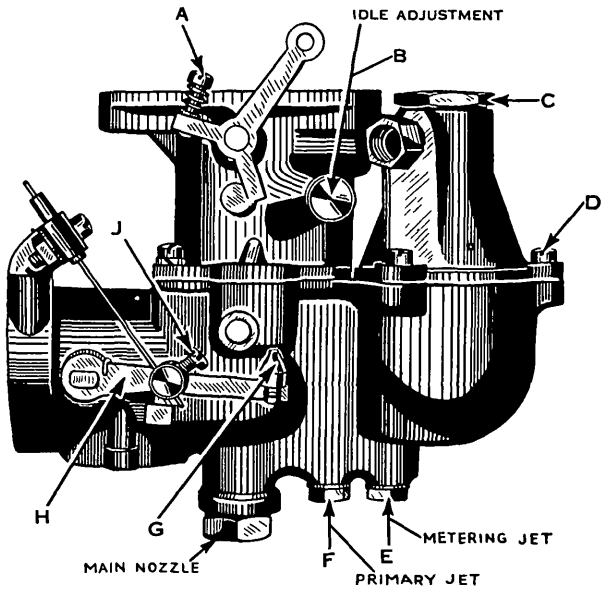


Fig 22

View of Ball and Ball carburetor Model S-1 used on Chrysler Model 50. (A) Throttle stop screw, (B) Idle adjustment, (C) Hexagon plug over carburetor strainer, (E) Fuel metering screw, (F) Carburetor jets, (G) Auxiliary air supply valve, (H) Choke valve lever. A cross section view and complete description of Ball and Ball carburetor will be found in the Ball and Ball section in the front of this book.

running of the engine, the jet (F) should be removed and cleaned by blowing through the top end of the jet. It will be noted that a very small hole is drilled in the side of the jet near the bottom and a fine piece of foreign substance may partially or totally fill this hole which would retard the flow of fuel.

BALL AND BALL MODEL SV-26

This carburetor is of the plain tube type. Of the seventy-five degrees of throttle opening the first fifty degrees operate only the valve of the primary stage, while movement of accelerator above this point opens also the valve of the secondary stage, allowing gas from both throats to pass into the manifold.

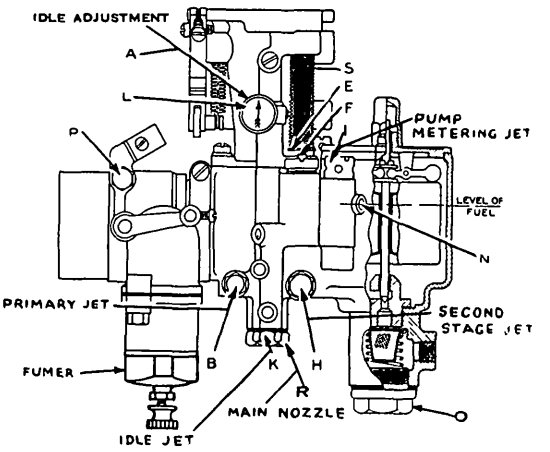


Fig. 23

Cutaway section of Ball and Ball carburetor Model SV-26 showing the location of the various jets for first and second stage. Failure of the motor to accelerate may be caused by the pump metering jet (I) being plugged up with dirt or solder.

Primary Metering Screw.—All orifices are fixed and can be changed only by removing the primary metering screw and inserting another with opening of the desired size. An extra primary metering screw (P) Fig. 23 interchangeable with the one which meters fuel to the primary carburetor (K) is placed in a lug cast on the primary air horn. These screws are stamped with the size of the orifice. The one with the smaller number should be used in the instrument in the summer, the other in the winter.

Idle Adjustment.—There is only one other adjustment, that for idling. Screw in the adjusting screw (A) Fig. 23 until it stops, then unscrew one-half turn. Start the engine and let it warm up, then make the correct adjustment. Turn the adjusting screw (A) clockwise for richer mixture, turn anti-clockwise for a leaner. If there is a weak cylinder, or if the spark is too far advanced, the engine will roll as with improper adjustment. If engine idles too fast, back off the stop screw on the throttle lever to get the desired speed.

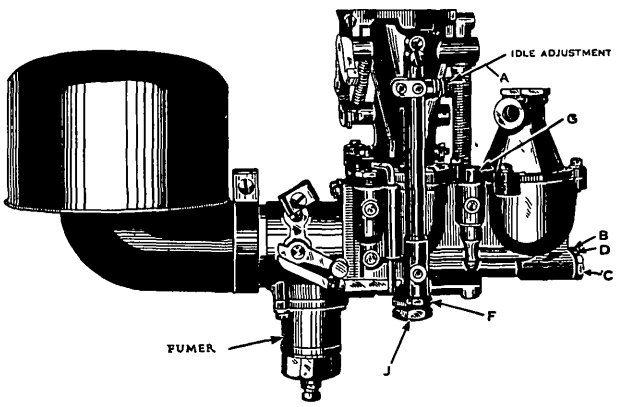


Fig. 23A

Ball and Ball carburetor Model SV used on early models of Chrysler 70. Adjustment procedure is the same as that for later models. (A) idle adjustment; (C) primary metering screw.

To Clean Carburetor.—To clean the strainer, remove by unscrewing the hexagon nut (O). If an accumulation of water or solid particles is found in the strainer, a thorough cleaning of the passages should be made after removing plugs (R) and (K) and the metering screws (H) and (I), which can be easily cleaned by blowing out or by means of a small wire.

BALL AND BALL MODEL SV-35–37

The carburetor is of the plain tube double stage type. The first three-quarters of throttle opening operates the valve of the primary stage and the balance of throttle opening, controlled by the accelerator, operates the secondary stage valve, allowing the gas from both throats to pass into the intake manifold.

All orifices are fixed. The mixture in the operating range is determined by the diameter of the passage in the primary metering screw (A, Fig. 24). If, due to unusual weather or local conditions, a richer or leaner mixture is necessary, a metering screw having a passage of the proper size can be substituted.

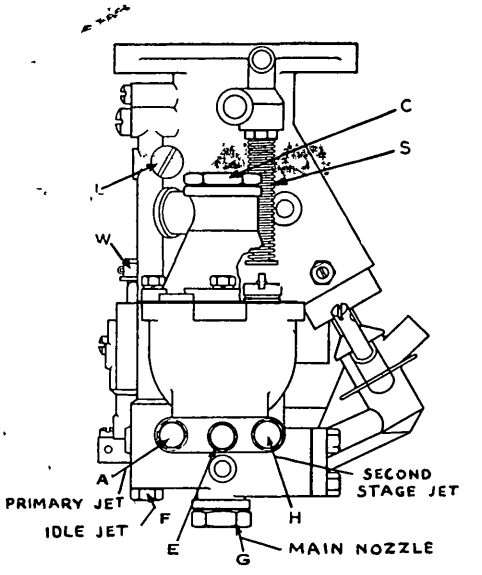


Fig. 25

End view of Ball and Ball carburetor Model SV-37 showing location of primary jets, secondary stage jets, main nozzle and idling jet.

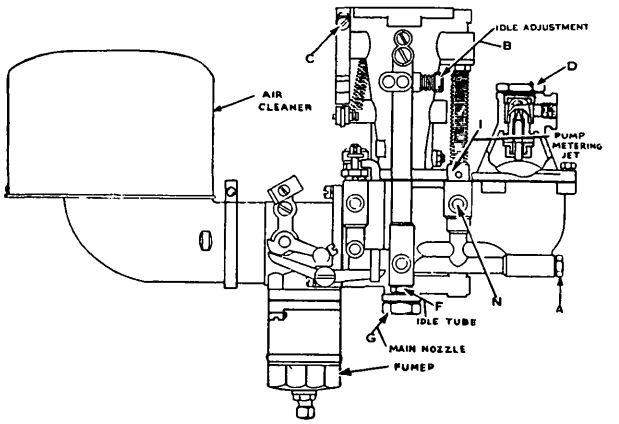


Fig. 24

Side view of Ball and Ball carburetor type SV-37 showing cutaway of float valve assembly and location of gas line screens.

Adjustment.— The idle mixture and closed throttle running are controlled by the idle adjustment screw (B) Fig. 24 which operates on the air and by turning it in a clockwise direction the mixture is enriched. A leaner mixture is obtained by turning the screw in an anti-clockwise direction. The proper setting for the idle speed adjustment screw is from ¾ to 1¼ turns open. If the screw is turned out further than this the mixture will be too lean and be noticed by an overloading condition when accelerating after coasting. If, after adjusting the idle mixture, the engine idles too fast the throttle stop screw (C) should be turned in an anti-clockwise direction until the desired speed is obtained.

To Clean Carburetor.—A strainer is attached to the underside of the plug (D) Fig. 24 and should be removed once every two or three months and thoroughly cleaned. It is advisable to remove the drain plug (E) Fig. 25 at the same time so as to drain out any sediment or water which may have collected in the bottom of the float chamber. If an accumulation of solid particles is found in the strainer a thorough cleaning of the fuel passages should be made by removing the plugs (E), (F) and (G) Fig. 25, as well as the metering jets (A), (H) and (I) Figs. 24 and 25. These jets can be easily cleaned by blowing through them.

BALL AND BALL MODEL DB-20

The carburetor is of the plain tube double stage type. The first three-quarters of throttle opening operates the valve of the primary stage and the balance of throttle opening, controlled by the accelerator, operates the secondary stage valve, allowing the gas from both stages to pass into the intake manifold.

All orifices are fixed. The mixture in the operating range is determined by the diameter of the passage in the pump tube (A) Fig. 26. If, due to unusual weather or local conditions, a richer or leaner mixture is necessary, a metering screw having a passage of the proper size can be substituted.

A pump is used to supply the extra fuel for acceleration and the amount of fuel supplied is regulated by the pump by-pass adjustment (B) Fig. 26 which should be closed in winter and opened three-quarters of a turn in summer.

Ajdustment. The idle mixture and closed throttle running are controlled by the idle adjustment screw (C) Fig. 26 which operates on the gas and

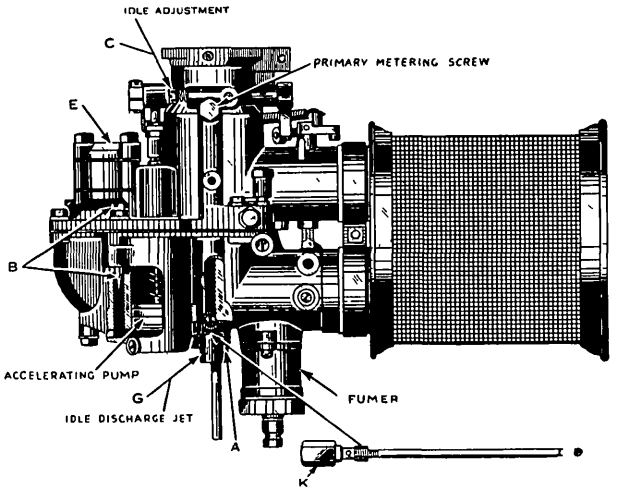


Fig 26

Side view of Ball and Ball carburetor Model DB-22 showing cutaway section of accelerator pump and idle discharge tube. The insert (K) shows idle tube used on late Model DB-22.

by turning it in an anti-clockwise direction the mixture is enriched. A leaner mixture is obtained by turning the screw in a clockwise direction. The proper setting for the idle speed adjustment screw is from ¾ to 1¼ turns open. If the screw is turned out further than this the mixture will be too rich and be noticed by an overloading condition when idling. The proper method for setting the idle is as follows: After the engine has attained its normal operating temperature, turn the idle screw (C) in an anti-clockwise direction until engine rolls, then turn idle screw clockwise to the point where the roll ceases. If the engine idles too fast the throttle stop screw (D) Fig. 27 should be turned in an anti-clockwise direction until the desired speed is obtained.

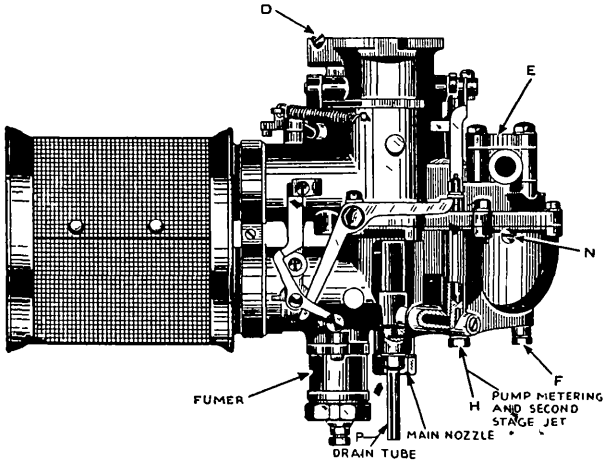


Fig. 27

Cutaway section of two stage Ball and Ball carburetor Model DB-22 showing location of metering jets. Note the cutaway portion above pump metering and second stage jets. The drain tube (P) extends down to the engine pan and allows excess gasoline in the carburetor body to pass out to ground.

To Clean Carburetor. A strainer is attached to the underside of the cap (E) Fig. 27 which is held in place by four cap screws and should be removed once every two or three months and thoroughly cleaned. It is advisable to remove the drain plug (F) at the same time so as to drain out any sediment or water which may have collected in the bottom of the float chamber. If an accumulation of solid particles is found in the strainer a thorough cleaning of the fuel passages should be made by removing the plugs (F) and (G) Figs. 26 and 27 as well as the metering jets (H) and (A). These jets can be easily cleaned by blowing through them.

CARTER CARBURETORS

Equipment.—Carter carburetors have been used as equipment on Chrysler Models 50 and 52 1926-27-28 and the Chrysler 6 1930. The adjustment information for each type of Carter carburetor will be found in the following paragraphs.

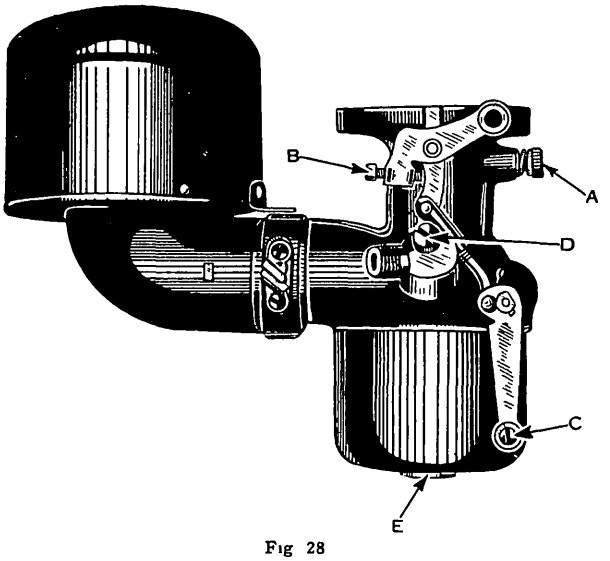


Fig 28

View of Carter Carburetor used on Chrysler Model 52. This carburetor has only idle adjustment and is not equipped with accelerating pump.

The Carter carburetor used on the early Model 52 cars was of the plain tube type and had no accelerating pump. The adjustment information is the same for Chrysler 50 and 52.

Later Model 52 cars used a carburetor equipped with an accelerating pump.

Idle Adjustment (without accelerating pump).—The idle mixture and closed throttle running are controlled by the idle adjustment screw (A) Fig. 28. This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw as above described the engine idles too fast, the throttle stop screw (B) should be turned anti-clockwise. These are the only

adjustments provided on the carburetor. The jets in the carburetor are so calibrated that the engine must not be operated with the air cleaner removed. The result will be a leaner mixture of gas.

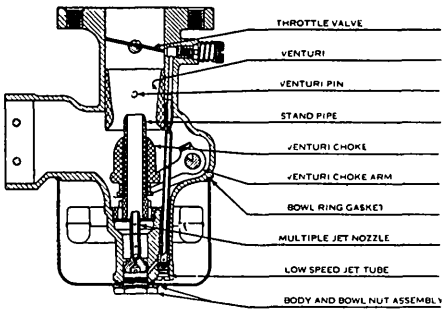


Fig. 29

Cross section view of Carter carburetor used on Chrysler Models 50 and early 52. The carburetors used on these models were not equipped with accelerating pumps.

Choke.—The choke lever operates on a cone in the air inlet passage and is raised when in the closed position or with the choke button fully withdrawn from the instrument panel, Fig. 29.

The choke control wire is held in place on the choke lever by means of the screw (C) Fig. 28. When the choke is closed the throttle is opened slightly by means of a small rod connecting the choke lever and the throttle lever. This facilitates starting in cold weather and should not be adjusted.

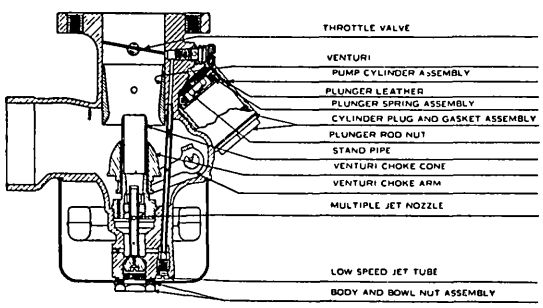


Fig. 30

Cross section view of Carter carburetor with accelerating pump used on late models of Chrysler 52.

To Clean Carburetor.—A strainer is housed under the fuel line connection and held in place by the screw (D) Fig. 28 which should be removed once every two or three months and thoroughly cleaned. If turning the idle adjustment screw (A) does not affect the idle running of the engine, the plug (E) should be removed and the jets cleaned by blowing through the bottom end of the jets. It will be noted that a very small hole is drilled in the jets and a fine piece of foreign substance may partially or totally fill this hole which would retard the flow of fuel. A hard substance such as a wire should not be used for cleaning the jets because it is liable to enlarge the holes in the jets, which will materially affect the running of the engine.

Idle Adjustment (with accelerating pump).—The idle mixture and closed throttle running is controlled by the idle adjustment screw (A) Fig. 31. This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw as above described, the engine idles too fast, the throttle stop screw (B) should be turned anti-clockwise, after which it may be necessary to readjust (A). The jets in the carburetor are so calibrated that the engine must not be operated with the air cleaner removed. The result will be a leaner mixture of gas.

Accelerating Pump.—A pump is used to supply the extra fuel for acceleration and the amount of fuel supplied is regulated by a small adjusting screw (C) Fig. 31 at the side of the pump plunger. This screw should be from ⅛ to ½ turn open in winter and from 1 to 1½ turns open in the summer.

Choke.—The choke lever operates on a cone in the air inlet passage Fig. 30 and is raised when in the closed position or with the choke button fully withdrawn from the instrument panel.

The choke control wire is held in place on the choke lever by means of the screw (D) Fig. 31. When the choke is closed the throttle is opened slightly by means of a small rod connecting the choke lever and the throttle lever. This facilitates starting in cold weather and should not be adjusted.

To Clean Carburetor.—A strainer is housed under the fuel line connection and held in place by the screw (E) Fig. 31 which should be removed once every two or three months and thoroughly cleaned. If turning the idle adjustment screw (A) does not affect the idle running of the engine, the plug (F) should be removed and the jets cleaned by blowing through the bottom end of the jets. It

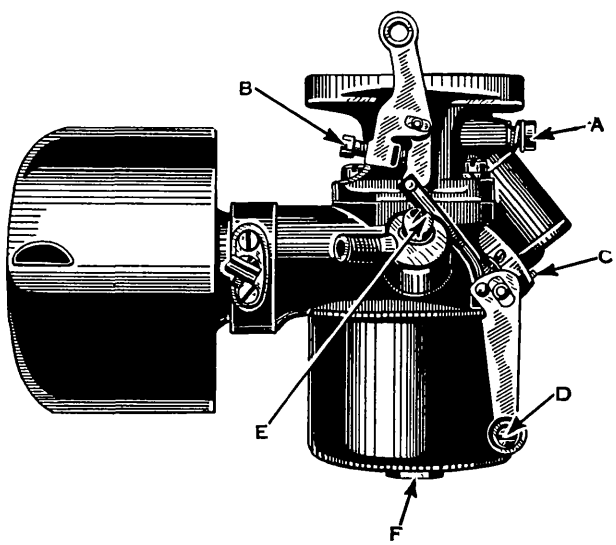


Fig. 31

View of Carter carburetor used on Chrysler automobiles showing accelerating pump and idle adjustment screw.

will be noted that a very small hole is drilled in the jets and a fine piece of foreign substance may partially or totally fill this hole, which would retard the flow of fuel. A hard substance such as a wire should not be used for cleaning the jets because it is liable to enlarge the holes in the jets, which will materially affect the running of the engine.

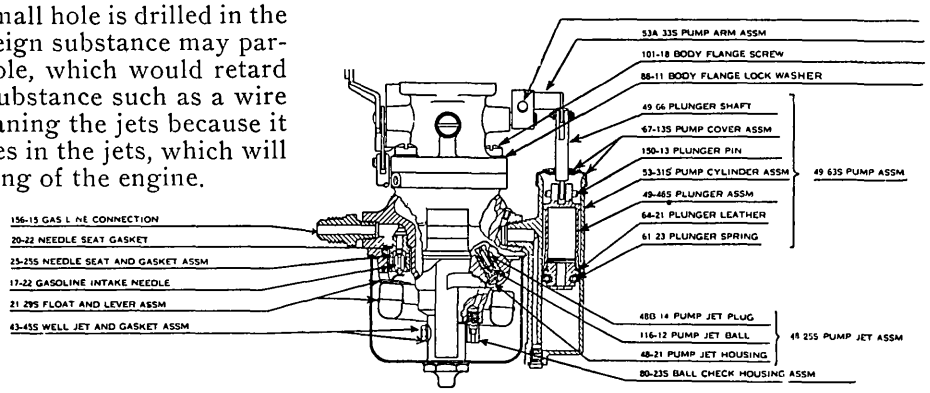

53A 335 PUMP ARM ASSM
101-18 BODY FLANGE SCREW
88-11 BODY FLANGE LOCK WASHER
49 66 PLUNGER SHAFT
67-135 PUMP COVER ASSM
150-13 PLUNGER PIN
53-315 PUMP CYLINDER ASSM
49-465 PLUNGER ASSM
64-21 PLUNGER LEATHER
61 23 PLUNGER SPRING
49D 335 PUMP ASSM
156-15 GAS L NE CONNECTION
20-22 NEEDLE SEAT GASKET
25-255 NEEDLE SEAT AND GASKET ASSM
17-22 GASOLINE INTAKE NEEDLE
21 295 FLOAT AND LEVER ASSM
43-435 WELL JET AND GASKET ASSM
48D 14 PUMP JET PLUG
116-12 PUMP JET BALL
48-21 PUMP JET HOUSING
48 255 PUMP JET ASSM
80-235 BALL CHECK HOUSING ASSM

Fig 32

Cross section view of Carter carburetor used on Chrysler 6 1930. The carburetor is cut away to show the accelerating pump and pump jet assembly

Accelerating Pump (Chrysler 6, 1930).—The pump consists of an air chamber and fuel container to supply the extra fuel for acceleration. When the throttle is closed, gasoline is drawn into pump cylinder through a ball check Fig. 32 which automatically closes when throttle is opened. Air is compressed in the plunger and a fine spray of gasoline is discharged into the venturi through the pump jet. If the ball check does not seat, the accelerating pump will not operate and if a careful cleaning does not remedy the condition, the assembly should be replaced.

The plunger leather must be soft and pliable. A dried up leather should be saturated with castor oil. To clean the pump jet when clogged, remove the pump jet assembly, clean with gasoline and blow clear with compressed air.

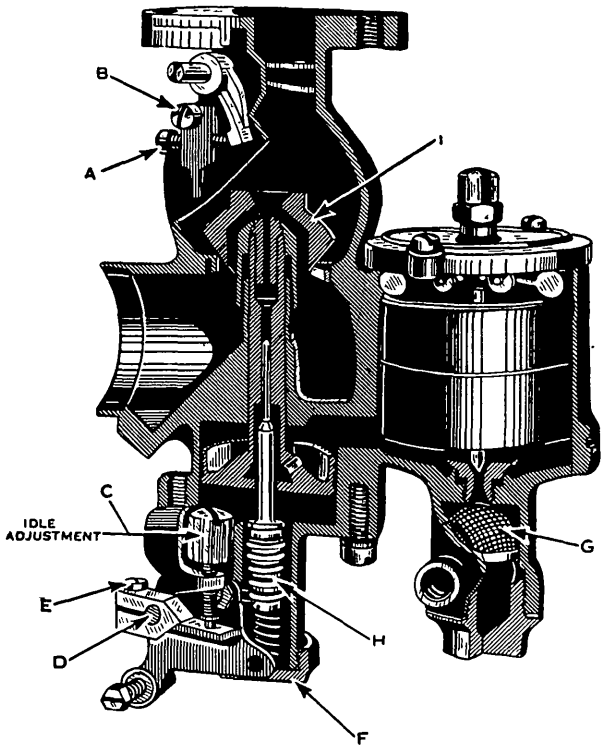


Fig. 33

Cross section view of Stewart carburetor used on Model 58 Chrysler showing the idle adjustment and pinion and lever shaft.

STEWART CARBURETORS

A Stewart carburetor of the metering valve expanding type was used on Chrysler 58 1925.

In this type of carburetor the proportion of air and gasoline in the mixture is automatically controlled by the air valve. The suction of the pistons raises this valve from its seat as the speed of the engine increases, allowing a greater proportion of air to enter the mixing chamber.

If this valve should stick, due to dirt particles, the carburetor should be taken apart and thoroughly cleaned at the first opportunity. Sandpaper or other abrasives should never be used.

Idle Adjustment.—Place the spark and hand throttle control levers, on top of the wheel, in the fully retarded positions. The throttle stop screw (A) Fig 33 should then be adjusted so that the engine will idle at approximately 250 R.P.M. Lock this adjustment by tightening the screw (B).

There is only one adjustment necessary and when this is properly made, the engine idling, the mixture will be correct for the entire range of engine operation. Turn down the screw (C) to the right (clockwise) for a richer mixture and to the left (anti-clockwise) for a leaner mixture. A satisfactory method of adjusting is to have the engine running idle at normal temperature with retarded spark, and turn the adjustment screw (C) to the left until a point is reached where the engine runs unsteadily or stalls, because of a lean mixture. Then reverse the operation: that is, turn the adjustment screw (C) to the right a notch at a time until the engine fires evenly.

The carburetor should be kept free from dirt, and to accomplish this a strainer has been placed at (G). This should be removed from time to time and cleaned of any dirt or foreign matter. In extremely cold weather the gasoline lines, float chamber and dash pot chamber should be drained periodically to remove all collected water.

Pinion Shaft and Lever Adjustment.—Ordinarily a sufficient range of adjustment can be obtained by means of the screw (C) Fig. 33. In the event, however, that the mixture cannot be made sufficiently lean by turning the screw (C) all the

way up or sufficiently rich by turning it all the way down, this can be taken care of by shifting the pinion shaft (H) in relation to the lever. To make this adjustment, first mark the present position, then loosen the adjusting lever clamp screw (E) with engine warmed up and running with retarded spark make the adjustment by rotating the pinion shaft (D) with the screwdriver slot in its end to the left for leaner mixture and to the right for richer mixture. Then tighten the adjusting arm clamp screw and make final adjustment in the regular manner with the screw (C). It is well to have the screw (C) in the center of its adjusting range while making this change so that seasonal changes may be made later.

In case the location of the adjustment arm is completely lost, this can be restored so that no difficulty will be encountered in starting the motor by the following means: Detach the carburetor from the motor and then remove the throttle body, or upper part, by unscrewing the two cap screws. This will expose the metering valve head. Then, with the adjusting arm released by loosening the clamp screw (E), and the cap of the gear housing (F) removed, the pinion shaft should be turned to the left so that the metering pin will be forced up until it just starts to lift the air valve from its seat. Measurement should then be taken of the distance between the end of the gear housing (F) and the rack which carries the metering pin and slides within the gear housing. This can be done with a narrow scale or depth gauge. Next turn the pinion shaft to the right enough to force the metering pin rack down 1/16". Then, with the adjusting screw (C) down ½ its travel, clamp the adjusting arm with the screw (E). This will give an approximate adjustment so that the motor can be easily started, and after bringing up to normal temperature the final setting should be made by means of adjusting screw (C).

Caution: Connect control button wire to control arm so that arm stop rests against adjusting screw with button about ⅛" off dash; otherwise a rich mixture will be the result. At normal driving temperature, button should be completely pushed in, or depressed. When making adjustments to carburetor, see that choke is fully in. Adjusting arm should bear against adjusting screw. If choker wire prevents this, the adjustment will not be effective.

STROMBERG MODEL OE-1

Equipment.—Stromberg carburetors have been used as equipment on Chrysler automobiles since 1926. Complete adjustment information for each model of Stromberg carburetor used on Chrysler cars will be found in the following paragraphs.

Idle Adjustment.—The idle mixture and closed throttle running are controlled by the idle adjustment screw (A) Fig. 34. This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw (A) as above described the engine idles too fast, the throttle stop screw (E) should be turned to the left or anti-clockwise.

High Speed Adjustment.—The high speed and main driving adjustment is regulated by the adjustment screw (B) Fig. 34, which should be turned anti-clockwise to enrich the mixture or clockwise to lean the mixture.

It will be observed that two center punch marks are made on the carburetor as shown at (F) Fig. 34. One mark is on the body of the carburetor and the other on the high speed adjusting screw. The lower edge of the punch mark on the high speed adjusting screw should be even with the top edge of the carburetor body and both punch marks in line with each other for all normal driving, but certain local conditions may make it necessary to alter this adjustment slightly.

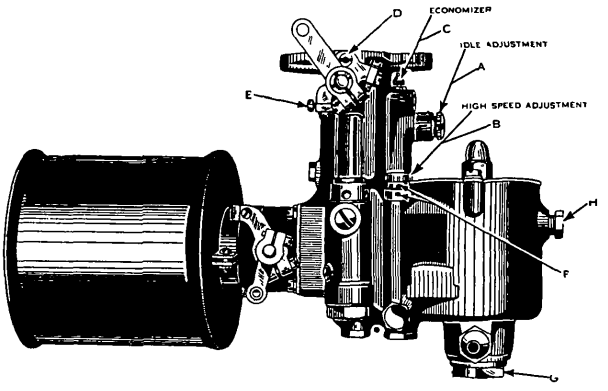


Fig. 34

View of Stromberg carburetor Model OE as used on Chrysler Model 60.

The proper procedure for complete readjustment of this high speed adjusting screw is to turn it clockwise until it reaches its seat and then it should be turned anti-clockwise 32 notches. The engine should then be started and the idle adjustment screw (A) adjusted for proper idling. Then the throttle should be opened to a point which will cause the engine to run at a speed approximating a vehicle speed of 25 miles per hour. With the spark lever set in the full retard position, the high speed adjustment screw (B) should be turned clockwise until a reduction of engine speed is observed, then the adjustment screw (B) should be turned anti-clockwise 2 or 3 notches.

Choke.—With choke on the instrument panel pushed "in," the choke butterfly valve should be inspected to see that it is wide open. It should also be inspected to see that it closes tightly when the choke button is pulled "out" for starting purposes, because, if the choke is open but slightly, starting may be difficult.

Accelerating Device.—The acceleration well in the carburetor is what is known as the manometer type. The function is that a column of fuel is suspended above the float chamber level by a vacuum when the throttle is closed or partially closed. On sudden opening of the throttle this vacuum decreases, allowing this column of fuel to fall, feeding in through what is known as an acceleration well discharge jet.

The well bleeder (D) Fig. 34 is provided to regulate the height of fuel column in the accelerating well. This bleeder is made with a predetermined diameter of hole and requires no attention or adjustment.

Economizer.—A lever mounted on the throttle shaft operates an economizer needle valve (C) Fig. 34, which automatically furnishes the most economical operating mixture under average driving conditions. The adjustment should not be disturbed. To clean strainer, drain plug (G) should be removed.

STROMBERG MODEL OX-2

A number of Chrysler Model 70 cars came equipped with Stromberg Model OX-2 carburetors. The first models were not equipped with fumers. The fumer was added on later models.

Adustment.—The adjustment procedure is the same as that for the OX type of carburetor used on the Model 80. On some of the Model 70 cars, the idle adjustment was located on the side of the carburetor next to the motor while on others the idle adjusting screw was located on the side of the carburetor away from the motor (see adjustment information for Stromberg OX-3 used on Chrysler 80).

STROMBERG MODEL OX-3

Two types of Stromberg were used on Chrysler 80 models. The early models were equipped with Stromberg Model OX and the later cars were equipped with UX type carburetors.

Idle Adjustment.—The idle mixture and closed throttle running are controlled by the idle adjustment screw (A) Fig. 35. This operates on the air, so that turning it clockwise gives a rich mixture and anti-clockwise a leaner one. If after adjusting the idle adjustment screw (A) as above described the motor idles too fast, the throttle stop screw (F) should be turned to the left or anti-clockwise. If the motor idles too slow and stops, screw (F) should be turned to the right or clockwise.

High Speed Adjustment.—The high speed and main driving adjustments are regulated by a dial (B) Fig. 35 which limits the amount of adjustment to one complete turn of the needle: one-half turn rich and one-half turn lean from a predetermined correct mixture. Four letters spelling the word "Rich" are placed on one side with an arrow indicating the direction in which (anti-clockwise) this needle should be turned in order to enrich the mixture. On the other side the four letters spell "Lean" with an arrow indicating the direction in which (clockwise) the needle should be turned to lean the mixture. This dial is so arranged that it has eight evenly spaced letters. Each one of these letters differs from one another. Should it be desirable to get a finer adjustment it is so designed and constructed that the needle can be turned and stopped between any two of the letters. A stop bracket pointer attached to the carburetor body indicates the mixture setting.

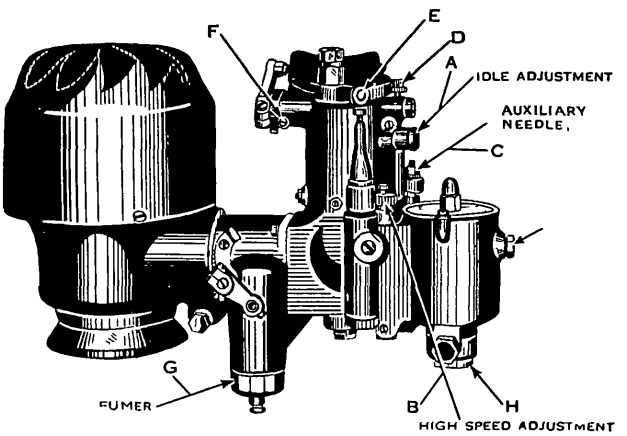


Fig 35

View of Stromberg carburetor Model OX-3 showing fumer used for starting This carburetor is used on Chrysler Model 80

To set the carburetor at the predetermined normal mixture the high speed arrow (B) should be adjusted so that the indicator points midway between letters "N" and "R." The adjustment can be referred to by letter. For example, if the pointer indicates letter "N," that means that the adjustment is set one notch lean; if set at "R," one notch rich, etc.

Caution: High Speed adjusting screws are not interchangeable.

Auxiliary Needle. — Another feature incorporated in this carburetor is an auxiliary needle (C) Fig. 35, operated by a lever and cam from the choke shaft which by-passes fuel around the high speed adjustment, giving a richer mixture only for starting and during the warming up period when the choke is in use. This auxiliary needle should always remain closed when the choke is in the full open position. This may be checked by opening the choke wide and holding the lever which operates or raises the auxiliary needle to see if there is a slight amount of backlash or clearance between the nut on the top of this needle and the fork which lifts it off the seat. This clearance should be between .004" and .010".

Choke.—With choke lever on the dash set in "RUN" or vertical position, carefully check to see that the choke butterfly valve is wide open, also that the valve closes tightly for starting purposes.

Accelerating Well.—The acceleration well in the carburetor is what is known as a manometer type of well. The function is that a column of fuel is suspended above the float chamber lever by a vacuum when the throttle is closed or partially closed. On sudden opening of the throttle this vacuum decreases, allowing this column of fuel to fall, feeding in through what is known as an acceleration well discharge jet. The carburetor is provided with a double end well bleeder (E) Fig. 35, having a small orifice on one end and a larger orifice on the other. The bleeder is threaded on each end and when assembled to the carburetor the threads on the exposed end are protected by a sleeve, which is easily removed. The end screwed into the carburetor regulates the height of fuel column in the accelerating well; the outer hole has no effect. With the small hole end screwed into the carburetor, the accelerating charge is greatest in amount and is the correct setting for cold weather driving. With the large hole end screwed into the carburetor, the accelerating charge is least in amount and is the correct setting for warm weather driving.

Economizer Needle.—A lever mounted on the throttle shaft operates an economizer needle valve (D) Fig. 35, which automatically furnishes the most economical operating mixture under average driving conditions. The adjustment should not be disturbed.

To clean strainer, drain plug (H) Fig. 35 should be removed.

STROMBERG MODEL T-1

The carburetor used on Chrysler Model 62 was a Stromberg Model T with accelerating device and economizer.

Idle Adjustment.—The idle mixture and closed throttle running are controlled by the idle adustment screw (A) Fig. 36. This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw (A) as above described the engine idles too fast, the throttle stop screw (B) should be turned to the left or anti-clockwise.

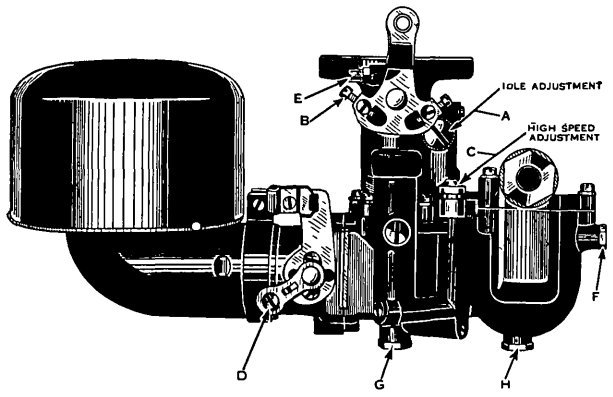


Fig. 36

View showing Stromberg carburetor Model T-1 used on Chrysler Model 62.

High Speed Adjustment.—The high speed and main driving adjustment is regulated by the adjustment screw (C) Fig. 36 which should be turned anti-clockwise to enrich the mixture or clockwise to lean the mixture.

It will be observed that there are two arrow marks, one on the carburetor float cover and another on the high speed adjusting screw. The points of each arrow should register together for all normal driving, but certain local conditions may make it necessary to alter this adjustment slightly.

The proper procedure for complete readjustment of this high speed adjusting screw is to turn it clockwise until it reaches its seat and then it should be turned anti-clockwise 32 notches. The engine should then be started and the idle adjustment screw (A) adjusted for proper idling. Then the throttle should be opened to a point which will cause the engine to run at a speed approximating a vehicle speed of 25 miles per hour. With the spark lever set in the full retard position, the high-speed adjustment screw (C) should be turned anti-clockwise 2 or 3 notches.

Choke.—With choke on the instrument panel pushed in, the choke butterfly valve should be inspected to see that it is wide open. It should also be inspected to see that it closes tightly when the choke button is pulled out for starting purposes, because, if the choke is open but slightly, starting may be difficult. The choke operating wire is held in place by the screw (D).

Accelerating Device.—The acceleration well in the carburetor is what is known as the manometer type. The function is that a column of fuel is suspended above the float chamber level by a vacuum when the throttle is closed or partially closed. On sudden opening of the throttle this vacuum decreases, allowing this column of fuel to fall, feeding in through what is known as an acceleration well discharge jet.

The well bleeder (E) Fig. 36 is provided to regulate the height of fuel column in the accelerating well. This bleeder is made with two sizes of holes of a predetermined diameter. When the bleeder is assembled into the carburetor with the large hole out it is set properly for cold weather operation. The small hole should be out when set for warm weather operation.

Economizer.—A lever mounted on the throttle shaft operates an economizer needle valve which automatically furnishes the most economical operating mixture under average driving conditions. The adjustment should not be disturbed.

To Clean Carburetor.—To clean the carburetor, the drain plugs (G) and (H) Fig. 36 should be removed. The main jet may also be removed for cleaning by removing the plug (G).

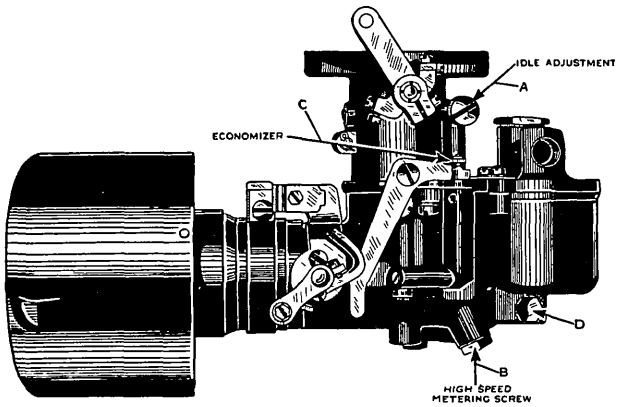


Fig. 37

View of Model U Stromberg carburetor used on Chrysler Model 65. To clean the carburetor the drain plug (D) should be removed The main jet may also be removed for cleaning by removing plug (B)

STROMBERG MODEL U

Carburetor used on Chrysler Model 66 was Stromberg Model U. The adjustment information for both Model 65 and 66 is the same.

Idle Adjustment.—The idle mixture and closed throttle running are controlled by the idle adjustment screw (A) Fig. 38. This operates on the air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If after adjusting the idle adjustment screw (A) as above described the engine idles too fast, the throttle stop screw (C) should be turned to the left or anti-clockwise.

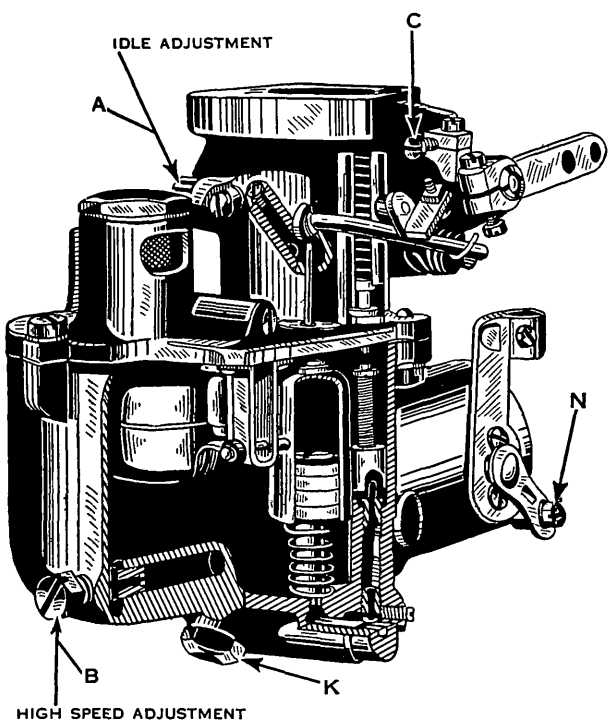


Fig 38

Sectional view of Stromberg Model U carburetor used on Chrysler Model 66 The adjustment information for this carburetor is the same as that on model 65 Chrysler.

High Speed Adjustment.—The high speed or main driving jet is fixed. The mixture in the operating range is determined by the diameter of the passage in the metering screw (B) Fig. 38. If, due to unusual weather or local conditions, a richer or leaner mixture is necessary, a metering screw having a passage of the proper size can be obtained.

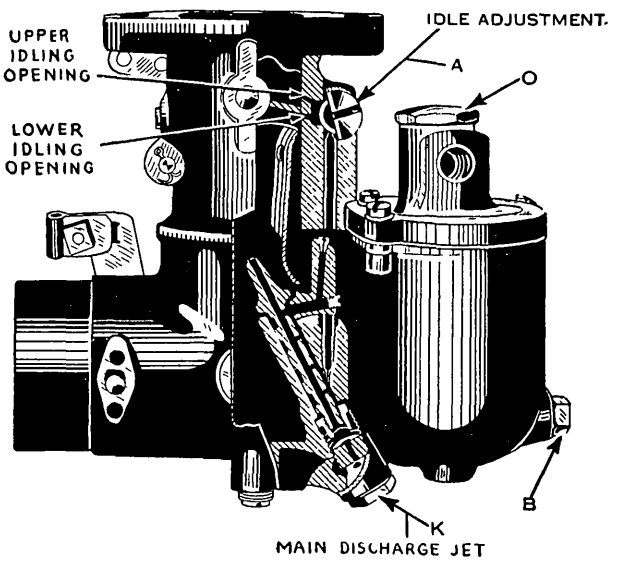


Fig 39

Sectional view of Stromberg Model U carburetor used on Chrysler Model 66 The illustration is a cutaway to show the main or high driving speed jet.

Choke.—With choke on the instrument panel pushed in, the choke butterfly valve should be inspected to see that it is wide open. It should also be inspected to see that it closes tightly when the choke button is pulled out for starting purposes, because, if the choke is open but slightly, starting may be difficult. The choke operating wire is held in place by the screw (N).

Economizer.—A lever mounted on the throttle shaft operates an economizer needle valve which automatically furnishes the most economical operating mixture under average driving conditions. The adjustment should not be disturbed.

To Clean Carburetor.—To clean the carburetor remove strainer plug (O) Fig. 39 and remove strainer. Main metering jet (B) may also be removed for cleaning. If an accumulation of solid particles is found in the strainer a thorough cleaning of the fuel passages should be made by removing the metering jets (B) and (K). These jets can be easily cleaned by blowing through them.

STROMBERG MODEL UX-4

The later models of Chrysler 80 used Stromberg Model UX carburetor equipped with fumer.

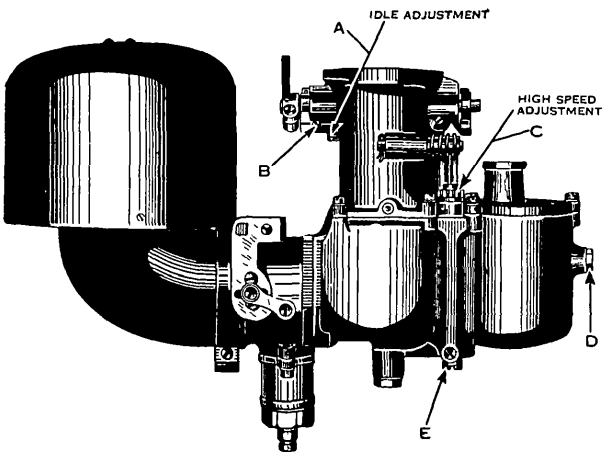


Fig 40

View of Stromberg Model UX-4 carburetor used on Chrysler Model 80.

Idle Adjustment.—The idle mixture and closed throttle running are controlled by the idle adjustment screw (A) Fig. 40. This operates on the air, so that turning clockwise gives a rich mixture and anti-clockwise a leaner one. If after adjusting the idle adjustment screw (A) as above described the engine idles too fast, the throttle stop screw (B) should be turned to the left or anti-clockwise. If the engine idles too slow and stops, screw (B) should be turned to the right or clockwise.

High Speed Adjustment.—The high speed and main driving adjustments are regulated by a dial (C) Fig. 40 which limits the amount of adjustment to one complete turn of the needle: one-half turn rich and one-half turn lean from a predetermined correct mixture. Four letters spelling the word "Rich" are placed on one side with an arrow indicating the direction in which (anti-clockwise) this needle should be turned in order to enrich the mixture. On the other side the four letters spell "Lean" with an arrow indicating the direction in which (clockwise) the needle should be turned to lean the mixture. This dial is so arranged that it has eight evenly spaced letters. Each one of these letters differs from one another. Should it be desirable to get a finer adjustment it is so designed and constructed that the needle can be turned and stopped between any two of the letters. A stop bracket pointer attached to the carburetor body indicates the mixture setting.

To set the carburetor at the predetermined normal mixture the high speed screw (C) should be adjusted so that the indicator points midway between letters (N) and (R). The adjustment can be referred to by letter. For example, if the pointer indicates letter "N," the adjustment is set one notch lean; if set at "R," one notch rich, etc.

Note: High speed adjusting screws are not interchangeable

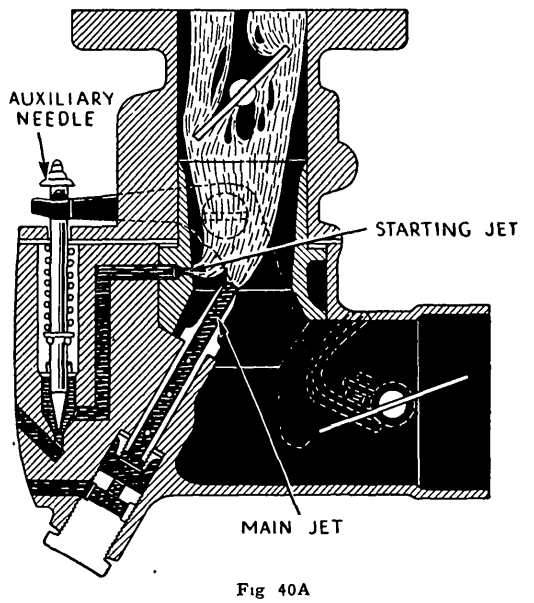


Fig 40A

Sectional view of Stromberg Model U carburetor used on Chrysler automobiles. The illustration shows the auxiliary needle valve and choke in the warming up position.

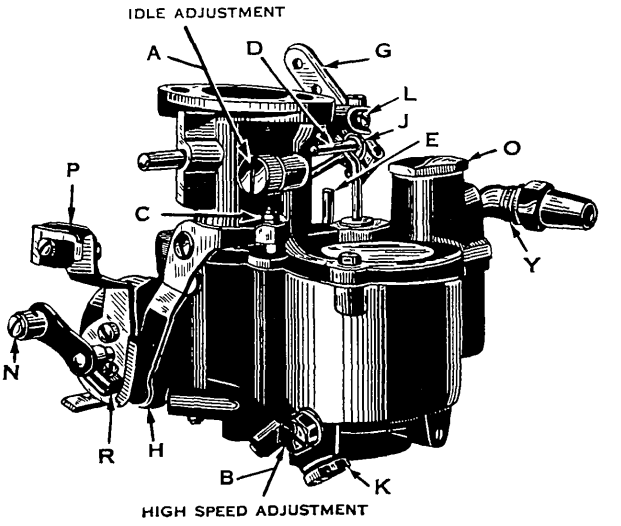


Fig 40B

View of Model U Stromberg carburetor used on Chrysler cars showing the economizer needle (E) This needle is operated by the pump control arm (D) and operates only at high speeds.

Auxiliary Needle. — Another feature incorporated in this carburetor is an auxiliary needle, Fig. 40A, operated by a lever and cam from the choke shaft which by-passes fuel around the high speed adjustment, giving a richer mixture only for starting and during the warming up period when the choke is in use. This auxiliary needle should always remain closed when the choke is in the full open position. This may be checked by opening the choke wide and holding the lever which operates or raises the auxiliary needle to see if there is a slight amount of backlash or clearance between the nut on the top of this needle and the fork which lifts it off the seat. This clearance should be between .004″ and .010″.

Economizer Needle.—A lever mounted on the throttle shaft operates an economizer needle valve Fig. 40B which automatically furnishes the most economical operating mixture under average driving conditions. The adjustment should not be disturbed.

STROMBERG DX-3

The same make and model of carburetor (Stromberg DX-1½") is used on both Model 77 and the New 70.

Manifold Heat Control.—All six cylinder models have manifold heat controls. (For more complete information see page 83).

The Stromberg DX carburetor is of the plain tube down draft type; all orifices are fixed. The mixture of the operating range is determined by the diameter of the main metering screw (10) Fig. 41. If due to unusual weather conditions, a richer or leaner mixture is necessary, a metering screw can be changed for one of proper size.

Idle Adjustment. — The idling mixture and closed throttle running are controlled by the idle adjustment screw (3) Fig. 42. This operates the air, so that by turning it clockwise results in a richer mixture. If, after adjusting the idling mixture, the engine idles too fast, the stop screw (5) Fig. 41 should be turned to the left.

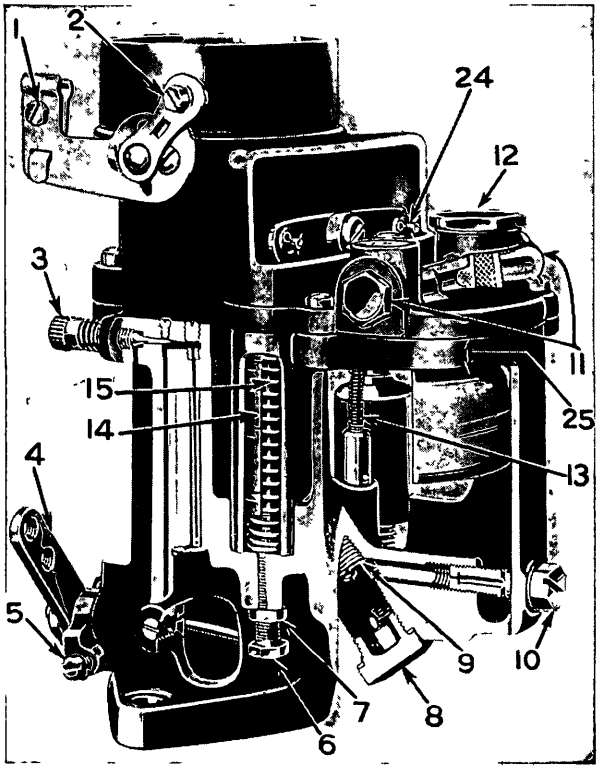


Fig 41

Cross section of Stromberg Model DX carburetor showing (1) choke control tube holder, (2) choke lever wire clamp screw, (3) idling needle valve, (4) throttle lever, (5) throttle stop set screw, (6) pump adjustment nut screw, (7) vacuum piston stop screw lock nut, (8) main discharge plug, (9) main discharge jet retainer plug, (10) main metering jet, (11) gasoline connection, (12) strainer plug, (13) economizer needle valve; (14) vacuum piston, (15) vacuum piston spring, (24) pump piston link, (25) float setting (See instructions), (26) idle discharge plug, (27) idle tube.

Accelerating Pump.—The mixture from the accelerating pump is adjustable and should be

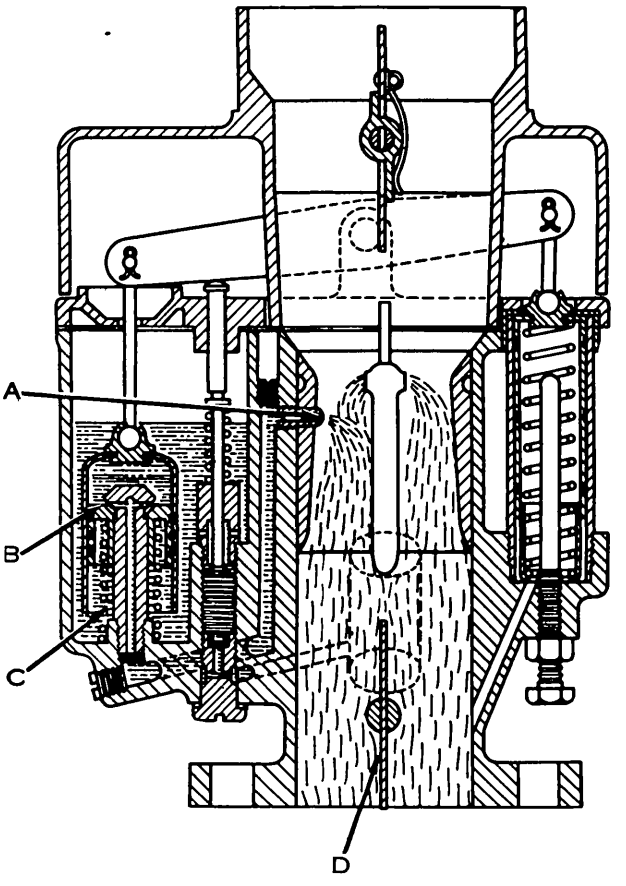


Fig. 41A.

Cross section view of Stromberg Model DX down draft carburetor used on Chrysler automobiles showing the accelerating pump action The throttle valve is shown in the wide open position with the pump delivering an extra charge of gasoline through the pump discharge jet (A).

changed for winter and summer. In the winter a greater discharge from the pump is desirable; this can be altered by loosening the lock nut (7) and screwing up clockwise on the screw (6) cuts down the accelerator pump charge, and is the summer adjustment; screwing down or anti-clockwise on the screw (6) is the winter adjustment. Be sure to tighten the lock nut (7) after adjusting.

Pump Stroke Adjustment (Stromberg DX-3). —Accelerating pumps on all Model DX carburetors are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of the screw (6) Fig. 41.

A condition may prevail whereby the pump stroke adjustment is so close that it is difficult to determine whether the stroke is too long or too short. In these cases if shortening the pump stroke improves the motor performance, the stroke was too long. But, if the stroke is too short, then shortening the stroke will aggravate the condition.

If the pump stroke is too short, the car owner may complain that the motor hesitates and stumbles accompanied by a sputtering in the carburetor. This condition may also cause the motor to die in traffic on deceleration after a quick acceleration.

To check, first try the car on the service floor by accelerating the motor from idle to high speed several times always dropping back to idle for at least 10 seconds each time after speeding up the motor. The object of this test is to get the motor to sputter in the carburetor. The pump stroke setting may be so close that the motor may not sputter for several trials. If adjustment is so close that the motor will not sputter, try shortening the stroke until the motor does sputter. (If the pump stroke happens to be too long, shortening will improve the motor performance). After the test is completed, lengthen the pump stroke until the motor runs smooth.

Important: After adjustment of the pump stroke is completed, test the car out on a level road.

If the pump stroke is too long, the car owner may complain that on acceleration the motor will hesitate and roll accompanied by an unpleasant jerking followed by the motor smoothing out. To check, first test the car out on the service floor. On quick acceleration the motor will have a tendency to stumble and roll and on deceleration the motor may run rich for 10 to 15 seconds and even die.

On a road test, the motor will stumble and hesitate on acceleration and then run rich for from 40 to 50 feet. To correct, shorten the pump stroke.

Choke.—With choke on the instrument panel pushed "in," the choke butterfly valve should be inspected to see that it is wide open. It should also be inspected to see that it closes tightly when the choke button is pulled "out" for starting purposes, because, if the choke is open but slightly, starting may be difficult. The choke operating wire is held in place by the screw (2) Fig. 41.

To Clean Carburetor.—To clean the carburetor remove strainer plug (12) and remove strainer. Main metering jet (10) Fig. 41 may also be removed for cleaning. If an accumulation of solid particles is found in the strainer a thorough cleaning of the fuel passages should be made by removing the metering jets Nos. 10 and 8. These jets can be easily cleaned by blowing through them.

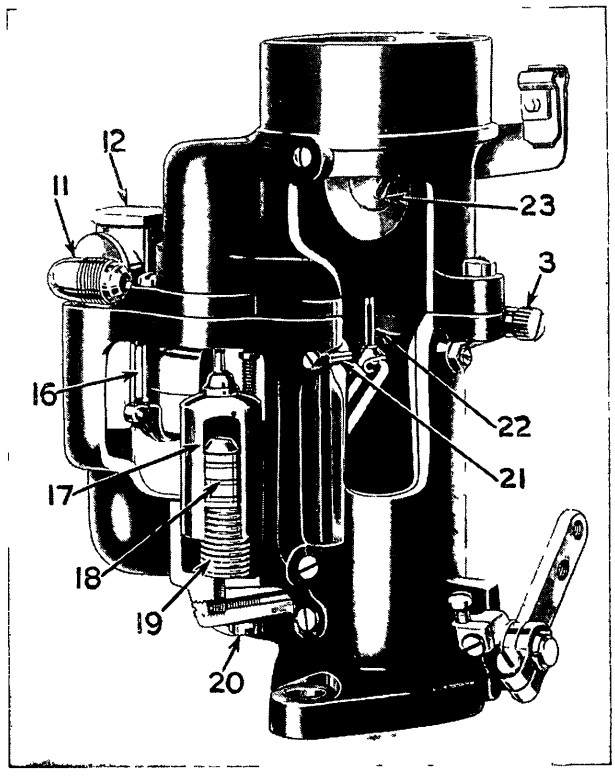


Fig 42

Cutaway section of Stromberg Model DX carburetor showing (3) idling adjustments, (11) gasoline connection, (12) strainer plug, (16) float needle valve and seat, (17) pump piston sleeve; (18) pump piston, (19) pump piston spring, (20) by-pass metering jet (economizer), (21) pump discharge nozzle, (23) choke valve (flapper type).

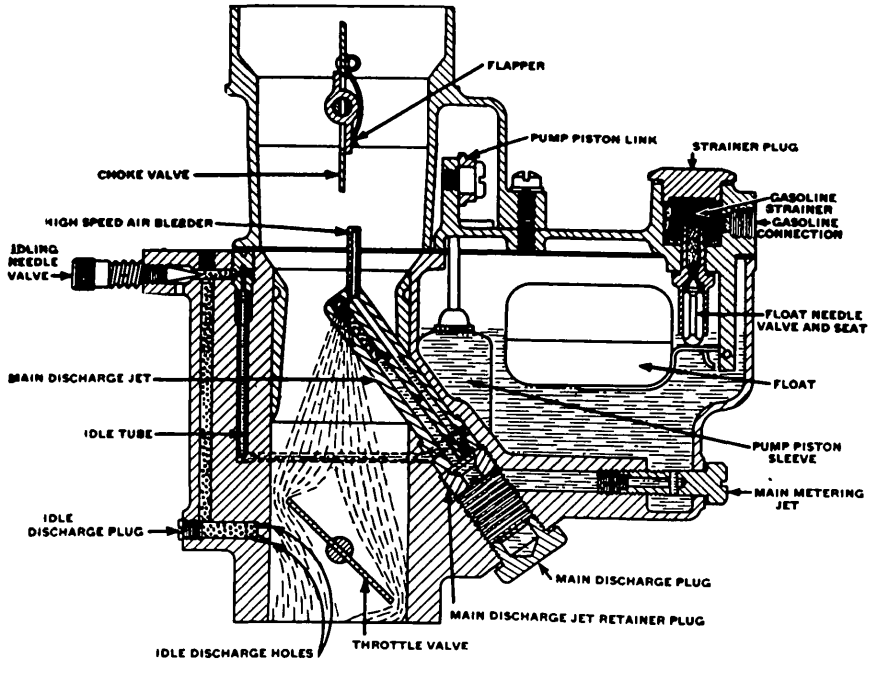


Fig. 42A.

Cross section view of Stromberg Model U carburetor used on Chrysler automobiles showing the arrangement of the main discharge and idling jets. The high speed air bleeder for the main discharge jet is mounted in the end of the jet as shown. The main discharge jet for all DX Stromberg carburetors is not changeable as to specifications and under no consideration should the high speed air bleeder or jet discharge holes be drilled out.

If trouble should be experienced at idling speed, remove the idle discharge plug and check to see that the idle discharge holes are not plugged up. The idle discharge holes are made in the body of the carburetor and under no consideration should these holes be drilled out.

Cord 1929-30

Motor Tune-Up

All motors equipped with double breaker ignition systems are critical on ignition timing. Care should be exercised not to confuse ignition trouble with carburetor trouble. All units such as distributors and spark plug points, timing chain, ignition timing, valve timing, etc., should be checked before tampering with the carburetor. The information following the tune-up operations is important and should be closely observed when tuning the motor.

Care should be exercised when adjusting the carburetor on Cord automobiles. The Duplex carburetor used on Cord has two throttle openings into the manifold and the throttle opening and idle adjustment next to the motor always controls the four center cylinders Nos. 3, 4, 5, 6. The throttle opening and idle adjustment which is on the opposite side next to the hood of the car always governs the two front and two back cylinders Nos. 1, 2, 7, 8. When adjusting one bank of cylinders remove the spark plug wires from the other bank. It is important, however, before attempting any carburetor adjustment to first warm the motor up thoroughly.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
3. Synchronize distributor points.
4. Check the ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan and generator belts; adjust if necessary.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Adjust carburetor; clean if necessary.

   Note: All duplex models of Schebler carburetors should be dismantled and cleaned every 15,000 miles of service. If this practice is not followed, plugging of the passage to the main jets may occur as the result of sediment around the base of the needle seat.
10. Road test car.

    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Tune-Up Precautions

The motors used in Cord 1929-30 models are Lycoming eight cylinder motors with a bore of 3¼" and a stroke of 4½". The special tune-up information for this motor is practically the same as that for Auburn 120 and 125. Turn to page one, Auburn section for special tune-up information.

OIL PRESSURE

The oil pressure on all models of Cord automobiles should show 10 lbs. at idling speed when the engine is warm and 35 lbs. at speeds of 50 miles per hour or over.

IGNITION TIMING

Cord all Models 1929-30.—On all models of Cord 1929-30 the ignition contact points should be set to a clearance not less than .018" nor more than .024" and preferably .022". The spark plug gap should be set from .025" to .030". The firing order is 1-6-2-5-8-3-7-4. Top dead center position for No. 1 piston can be located by the keyway in the front end of the crankshaft. When this keyway is in a vertical position that is, on top of the crankshaft, piston No. 1 will be at top dead center. 12.8° flywheel travel is approximately four flywheel teeth.

The distributor is provided with two sets of breaker arms operated by a four lobe cam. The stationary set of points fire the end bank of four cylinders; the movable set fire the center bank of four cylinders.

The complete timing and synchronizing operations consist of first correctly spacing the contact points; second timing the stationary set of points to the motor; third synchronizing the movable set of points to the stationary set of points.

To time the stationary set of points to the motor with the contact points set at .022" the points should just start to break contact when No. 1 piston entering compression stroke is 12.8° or four flywheel teeth (Ethyl gasoline 5 teeth) before top dead center with spark control fully advanced.

To Synchronize Breaker Arm on 8 Cylinder Distributors with Four Lobe Cams.—One set of contact points is stationary and the other set is movable. Adjust stationary set first and complete the synchronizing by adjustments to the movable set of points.

To set the contact clearance on the stationary set, arm (A) Fig. 1, turn the distributor shaft in the direction of rotation, viewed from the top,

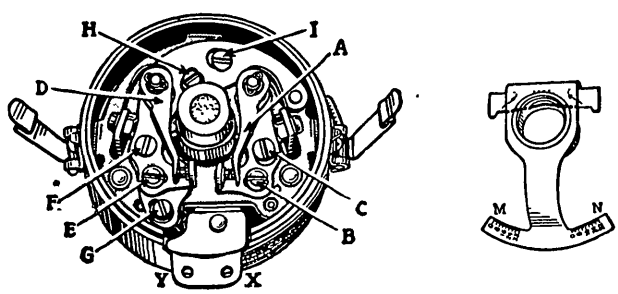


Fig. 1

Top view of double breaker arm distributor assembly with four lobe cams as used on Cord automobiles. One set of contact points is stationary and the other set is movable. The synchronizing tool is shown in the right view. When synchronizing the ignition timing, adjust the stationary set of points first.

until the rubbing block of the breaker arm (A) is on the peak of the cam. Loosen the screw (B) and turn the screw (C) until the contact opening is .022". The upper and lower limits of adjustment are not less than .018" nor more than .024" and preferably .022". After this operation is complete, tighten screw (B).

To adjust the movable set of points, turn the shaft until the rubbing block of breaker arm (D) is on the peak of the cam. Loosen screw (E) and by turning screw (F), set the contact point clearance of the movable set exactly the same as that of the stationary set (.022"). After this operation is complete, tighten screw (E).

Put the synchronizing tool as shown in Fig. 1 over the distributor shaft locking it with the slide pushed through showing the arrow that points in the direction of rotation as viewed from the top.

Next turn the shaft counter-clockwise, until the breaker arm (A) breaks contact. Note the mark on the (N) side of the synchronizing tool that is in line with the point (X) which is the edge of the slot in the distributor base rim. Continue to turn the shaft until the same marking on the (M) side of the tool is in line with the point (X). Loosen screw (G) and (H) and turn screw (I) until arm (D) breaks contact.

Recheck the timing again to make certain that the points are properly set and then tighten screws (G) and (H). Also check the contact opening of the movable set of points, arm (D), to see that the setting has not changed. If the setting has changed, reset the point opening and synchronize the arms again. Do not make any adjustments to the arm (A) but confine the synchronizing operation to the movable arm (D).

The graduations on the synchronizing tool represent engine degrees and the breaker arms must not be out of synchronism more than two degrees.

The eye cannot detect the moment the points open so in order to get an accurate synchronizing adjustment, connect an ammeter in the ignition circuit at the distributor terminal. If the ammeter on the car is used, make sure that the ignition switch is turned on. The instant the ammeter drops back to zero, the points have opened.

VALVE TIMING

Cord all Models 1929-30.—The valve tappet clearance for all models of Cord 1929-30 should be set at from .006" to .008" for the intake valve and .006" to .008" for the exhaust valve.

To check the valve timing set the valve tappet clearance at .010", for all models.

On engines up to and including serial No. 2785 crank the motor until No. 1 piston is at top dead center exhaust stroke. At this point, the intake valve should just start to open. Reset the valve tappet clearance for both intake and exhaust valves to from .006" to .008" after the timing operation is complete.

Beginning with engine serial No. 2786 and all engines beyond this number crank the motor until No. 1 piston entering exhaust stroke is 5° (flywheel travel) before top dead center. At this point the intake valve should just start to open. Reset the valve tappet clearance for both intake and exhaust valves to from .006" to .008" after the timing operation is complete.

GAS LINE SCREENS

All models of Cord 1929-30 were equipped with fuel pump feed and have strainer screens in the top of the gasoline bowl at the fuel pump Fig. 2 and the carburetor.

To clean the fuel pump screens, remove the glass bowl and clean the assembly. Make sure that the cork gasket is in good condition and properly seated when reassembling bowl into position. If the gasket is damaged, replace with a new one.

On Schebler Duplex Model S carburetors, the strainer screens can be removed for cleaning by first disconnecting the gasoline line and strainer body from the bottom of the carburetor. Remove the gauze and clean thoroughly in gasoline and blow clear with compressed air. Clean the inside of the strainer body thoroughly and reassemble, making sure that the gaskets are in place and that all connections are tight and do not leak.

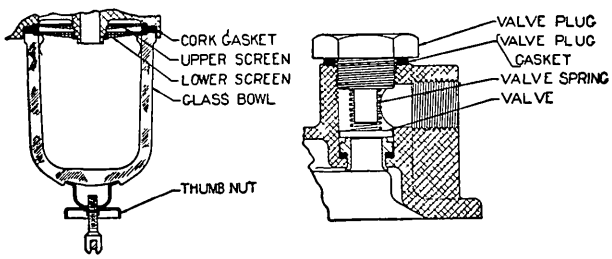


Fig. 2

Cross section view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVELS

All Models of Cord 1929-30 are equipped with Schebler Model S-1¼" Duplex carburetors. The correct float level is 25/64" to 27/64" measuring between the top of the float and the carburetor body when the float valve is seated as shown in Fig. 3. The gasoline level may be changed by bending the float lever up or down the required distance.

CARBURETOR SPECIFICATION DIAGNOSIS

The Schebler Model S carburetor used on Cord 1929-30 is of the full metering type. The amount of gasoline that is supplied to the main nozzle is

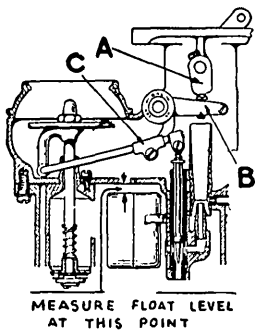


Fig. 3

Showing points at which float should be measured on Schebler Model S carburetors. The quickest method of checking the float level of Schebler carburetors you should see that the float lever arm stands approximately parallel with the milled flange of the carburetor body.

determined by the taper of the needle valve (B) Fig. 4. The action of this needle at different engine speeds is controlled by the air valve through the medium of the needle valve lift lever (D).

When air and gasoline are mixed in different proportions, explosions of quite different characteristics result. It requires about 5 lbs. of gasoline to every 100 lbs. of air before an explosixe mixture is obtained. It requires approximately 5.4 lbs. of gasoline to 100 lbs. of air before a mixture will fire in an ordinary automobile engine regularly. However, this mixture would be quite lean and would have very little power. For steady running, it requires approximately 6.2 lbs. of fuel per 100 lbs. of air, but 7.8% mixture would give the greatest power. While a mixture of 7.8 lbs. of fuel per 100 lbs. of air gives maximum power it is slightly too rich for best economy, and as the mixture becomes richer, the power loss becomes greater until at 15.3 lbs. of fuel per 100 lbs. of air the motor will not run.

From the above explanation it can be seen that there is a wide fuel mixture range from lean mixture to a mixture that is too rich with apparently no change in engine performance that can be noticed; therefore, all carburetor calibration changes should be avoided as far as possible.

If trouble is experienced in tuning the motor and the trouble is finally traced to the carburetor, after the carburetor has been removed and thoroughly cleaned, proceed as follows:

Air Valve Spring.—The air valve spring (A) Fig. 4 is located in the dash pot of the carburetor and is for the purpose of controlling the action of the air valve. If the air valve spring weakens in service, the tension against the air valve piston will not be great enough and a tendency toward a lean mixture will result. Also, a weak spring may cause the air valve to flutter. This condition is generally indicated by difficulty to obtain a correct carburetor adjustment at speeds above idling and in extreme cases a tendency for the motor to pop back through the carburetor.

When a condition of a weak air valve spring is encountered, the trouble should be corrected by replacing the old spring with a new one. These air valve springs are graduated to a certain tension and if they are stretched or distorted in any way, the carburetor balance is liable to be distorted.

Pump Cross Passage.—The cross passage (E) Fig. 4 connects the accelerating pump chamber with the venturi and controls the amount of gasoline admitted to the venturi during acceleration. Pump cross pasages are furnished in wire drill sizes and the number of the passage is stamped on the side of the body as shown in the illustration. The pump cross passage should never be tampered with until after the air valve spring has been checked.

Diagnosis, Accelerating Pump Cross Passage too Small.—If the cross passage is too small the car may have a flat spot on acceleration. This condition will be indicated by a popping back through the carburetor due to a lean mixture. This trouble may be corrected by installing a larger cross passage.

A very effective method of determining whether or not the cross passage is too small is to increase the size of the passage approximately two drill sizes at a time (install larger passages; do not drill out old pasageway) until the motor just smooths out on acceleration.

Diagnosis, Accelerating Pump Cross Passage too Large.—If the accelerating pump cross passage is too large, the car will have a tendency to Roll and load on fast acceleration. As a rule, this trouble is generally caused by someone unfamiliar with the proper calibration procedure drilling out the cross pasage and whenever this trouble is encountered, it can be corrected by replacing the cross passage with one of a smaller size.

Needle Valve Assembly.—The taper of the needle valve is graduated in degrees and each needle valve is numbered by rings on the body of the needle, (B) Fig. 4. A greater taper of the needle valve would mean a richer mixture and a straighter taper would mean a leaner mixture. It is quite difficult to determine a wrong size needle valve taper since a slight change especially in

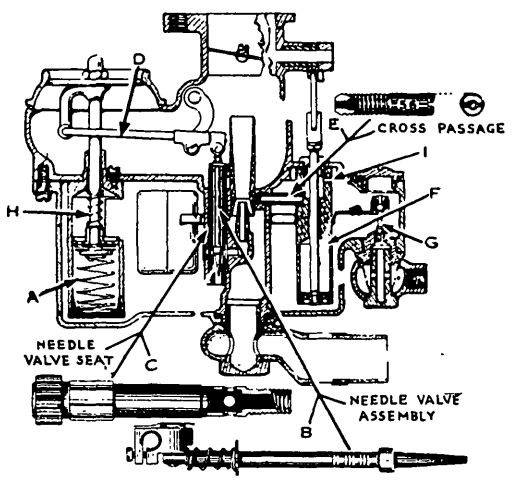


Fig. 4

Cross section view of Schebler Model S carburetor showing (A) lower air valve spring; (B) needle valve assembly. The size number of the needle valve is indicated by the number of rings machined on the body of the needle as shown. (C) needle valve seat. Due to the slight amount of wear on this part, it rarely needs changing. (D) needle valve lift lever; (E) metering or cross passage. The size of this part is stamped on the side of the body as shown. (F) accelerating pump assembly; (G) float needle valve assembly; (H) upper air valve spring.

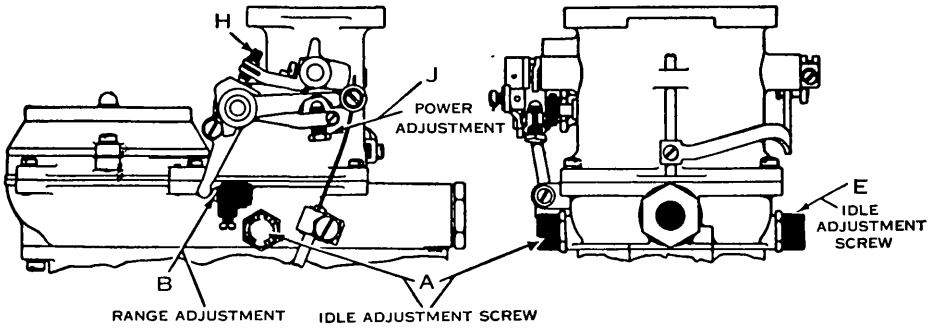


Fig. 5

Duplex carburetor showing two idle and one power adjustment. The throttle opening and idle adjustment next to the motor controls cylinders Nos. 3, 4, 5, 6. The outside throttle opening and idle adjustment controls cylinders Nos. 1, 2, 7, 8.

favor of a richer condition cannot be noticed in the performance of the car other than a lowering of the gasoline mileage. However, in extreme cases where someone unfamiliar with the proper carburetor calibration procedure has tampered with the carburetor by installing a needle with too great a taper, the trouble may be indicated by the motor Rolling and loading at speeds as the needle valve is lifted off its seat by the action of the air valve.

If the needle valve taper is too straight the mixture may be too lean and cause the motor to surge. The car will probably lack power on a hill with a tendency to miss and pop back.

Important.—When a case of needle valve trouble is indicated, always check to see that the needle valve lift lever (D) is not worn so that it binds or sticks in the fulcrum lever. This needle valve lift lever will sometimes wear to the point of where it sticks and interferes with the free operation of the needle valve. Whenever this trouble is encountered, it may be corrected by replacing the needle valve lift lever with a new one.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor for all models of Cord 1929-30.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
CORD 1929-30.....	L-29	Lyc. F.D.	8	3¼"x4½"	SCHEBLER S 1¼" Duplex

The carburetor adjustment information for all models of Cord 1929-30 is the same as that for Auburn models equipped with Schebler Model S Duplex (see Fig. 5). On page 8 of the Auburn section will be found special adjustment precautions and on page 12 of the Auburn section will be found complete adjustment information for Schebler Model S carburetors.

DeSoto 1928-30

Motor Tune-Up

In our present day, high speed high compression engines, efficient motor performance is more than ever dependent upon accurate adjustment and tune-up. On actual test, more than 70% of all so-called carburetor troubles have been traced to some other source.

Immediately following the tune-up operations will be found special information which should be closely observed when tuning the motor. Before changing or tampering with the carburetor care should be exercised to see that all other units are correctly and accurately adjusted.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Adjust valve tappets.
3. Check ignition timing; adjust if necessary.
   Note: It is very important on 8 cylinder models equipped with distributors having double contacts to see that the breaker is synchronized. See information in timing section.
4. Check manifold gaskets; see that manifold flange nuts are tight.
5. Clean gas line screens.
6. Check manifold heat control; adjust if necessary.
7. Check fan belt; adjust if loose.
8. Adjust carburetor if necessary.
   Note: If carburetor jets are dirty, the carburetor should be removed and thoroughly cleaned. Be sure and install new carburetor flange gaskets when carburetor is put back on car.

Ragged Idle

Ignition Timing.—Of all the motor tune-up operations for DeSoto the most critical is ignition timing, spark plug and contact point setting. Those models equipped with distributors having double breaker arms should be carefully and accurately synchronized. If the contact points are not properly synchronized, the motor will run rough. The symptoms are similar to those caused by a too rich carbureter mixture and are especially noticeable at idling speed.

To correct this condition, synchronize the points as described under ignition timing.

Distributor Points.—When tuning the motor it is important that the distributor points be thoroughly cleaned and squared up. Dirty distributor contacts may create a condition in motor performance very similar to a rich carburetor mixture condition. The motor will run poorly at low speeds and cut out at high speeds.

Warped Carburetor Flange.—Failure of motor to idle may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Extreme care should be exercised when bolting the carburetor to the intake manifold to see that both sides come up evenly.

The carburetor flange should be checked with a straight edge to see that it is perfectly square. If it is found to be out of true square up with a square mill file.

High Vacuum in Manifold.—A poor idling condition especially noticeable on deceleration may be caused by a high vacuum in the manifold over the throttle on DeSoto cars equipped with Stromberg DX carburetors. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to load and roll will be noticed. In extreme cases the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct this trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless the trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass.

Contact Points Not Properly Synchronized.—On DeSoto 8 cylinder models a rough condition of motor operation at idling speed may be caused by the breaker contacts not being properly synchronized. The symptoms are similar to those caused by a too rich carburetor mixture and care should be exercised not to confuse these two conditions.

It is advisable in every case to first check the distributor points as described in the ignition timing section under the heading To Synchronize Distributors with Four Lobe Cams.

Carburetor.—When tuning a motor the carburetor is the last unit that should be checked. Do not, under any condition, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. Follow closely all recommendations relative to timing given in the paragraphs above.

If the trouble is finally traced to the carburetor first make certain that the carburetor has been properly adjusted (see carburetor adjustment instructions in the Carburetor Adjustment section).

If the trouble still persists, remove and thoroughly clean all jets and passages.

If cleaning and correctly adjusting the carburetor does not eliminate the trouble, turn to idling jets in the Carburetor Specification Diagnosis section.

Air Leaks.—A poor idling condition may be caused by air leaks at the gasket and around the throttle valve shaft. To check for this condition, use a squirt can full of gasoline. If the motor performance is affected when gasoline is squirted over the edge of a gasket the gasket will be found to leak. Replace with a new gasket.

Poor Acceleration

Stromberg Pump Lever Fulcrum Screw.—Failure of motor to accelerate on DeSoto cars equipped with Stromberg DX carburetors, may be caused by the accelerating pump lever fulcrum screw working loose and causing the pump lever to bind.

The car owner will probably complain that the car will accelerate properly at times and at other times it will have a decided flat spot. Correct this trouble by tightening the fulcrum screw.

Accelerating Pump, (Stromberg Model DX).—If too much fuel is delivered by the accelerating pump for extreme hot weather even after the pump adjustment is screwed all the way up, proceed as follows:

The pump discharge nozzle (21) Fig. 9 should be changed from a No. 64 to a No. 75. On DeSoto 8 cylinder cars beginning with serial No. 5162127 a No. 64 hole has been drilled in the pump piston (18) through the flat part on the piston head to the inside of the piston. This by-passes a certain amount of fuel and cuts down the amount of fuel delivered during the period of acceleration.

Caution: Do not make both changes in the same carburetor. That is, using a No. 75 pump discharge nozzle together with a 64 hole in the piston.

Accelerating Pump Adjustment.—Pump adjustment screw (6) Fig. 8 controls the quantity of fuel delivered by the accelerating pump. This screw is properly set at the factory for normal operating conditions. In hot weather, the accelerating pump discharge may be reduced by turning this screw up or to the right and in winter the quantity may be increased by turning to the left or down. Lock nut (7) should be retightened so that the adjustment will not change. See accelerating pump information in carburetor specification diagnosis section.

Spark Plug Point Clearance.—Poor motor performance on fast acceleration may be caused by improper setting of the spark plug point clearance. If trouble is experienced by the motor cutting out either on fast acceleration or a hard pull, try setting the spark plug points at .022". This procedure is recommended only in hilly localities where this trouble may be experienced. See ignition timing table for correct ignition adjustment information.

Lack of Power

Timing.—Lack of power may be caused either by improper or incorrect ignition or valve timing. Check both the ignition and valve timing.

Carburetor.—When tuning a motor, the carburetor is the last unit that should be checked. Do not, under any condition, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. Follow closely, all recommendations relative to timing given in the paragraphs above.

If the trouble is finally traced to the carburetor, first make certain that the carburetor has been properly adjusted. (See carburetor adjustment instructions in Carburetor Adjustment section.)

If the trouble still persists, remove and thoroughly clean all jets and passages. If cleaning and correctly adjusting the carburetor does not eliminate the trouble, turn to Carburetor Specification Diagnosis.

Lack of power may be caused by the main metering jet, by-pass jet, main discharge jet, high speed air bleed or venturi tube having been changed by someone not familiar with correct carburetor calibration procedure.

Low Gasoline Mileage

Auxiliary Needle Valve Held Open.—On cars equipped with Stromberg Model U carburetors, low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever, thus holding the auxiliary needle valve open.

To correct, set the auxiliary control lever cam so that there is approximately 1/16" clearance between the cam and the auxiliary control lever. See Fig. 19A, page 79, of the Chrysler section.

Also check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works freely.

Stromberg U-1 Die Cast Carburetor.—A few Stromberg U-1 die cast DeSoto carburetors do not have an auxiliary control or warming-up needle. On these carburetors, the gasoline supply channels for the warming up nozzle were left open but a blank nozzle was used to prevent gasoline from being drawn into the air stream.

Low gasoline mileage may be caused by gasoline being drawn into the air stream past the blank plug behind the venturi tube. The sketch, Fig. 1, illustrates how a blank plug may be driven into the channel leading from the float chamber underneath the unused auxiliary control needle hole to prevent the above condition.

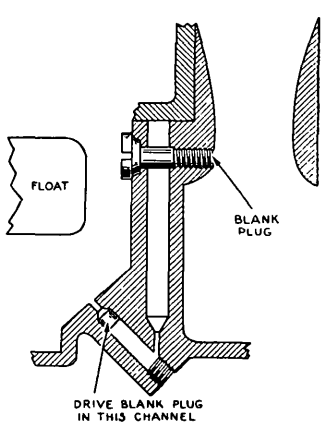


Fig. 1

Sectional view of Stromberg U-1 carburetor used on DeSoto automobile showing method of driving a blank plug into the auxiliary control or warming up needle channel. This plug is inserted in cases where carburetors leak at this point.

Carburetor.—In most cases where low gasoline mileage has been traced to the carburetor it will be found that the carburetor has not been properly adjusted, especially on carburetors having a high speed adjusting needle.

If someone unfamiliar with correct carburetor calibration procedure has tampered with the carburetor, the trouble may be due to a change in the main metering jet, by-pass jet, main discharge jet, high speed air bleeder, or venturi tube of the wrong size.

Motor Loading on a Pull

If trouble is experienced with the motor loading on a pull, first check to see that the carburetor is properly adjusted. (See Adjustment Section.) If the trouble is due to the internal specifications of the carburetor having been changed, see Jet Specification Diagnosis in the Carburetor Specification Diagnosis section.

Motor Misfiring

Grounded Distributor Arms. — On motors equipped with double breaker distributors it sometimes happens that through rough handling, the fiber on the movable arm is damaged or worn in such a manner that the metal portion of the arm will slip down on the bushing and ground out against the base. When this happens, four cylinders will be shorted out and can only be corrected by installing a complete new distributor arm.

Motor Noise

Warped Carburetor or Manifold Flange.—A whistling noise may be caused by a warped carburetor or manifold flange. This trouble can be located by the aid of a squirt can full of gasoline. If the noise is caused by a loose manifold flange gasket, the whistling will cease when gasoline is squirted on the flange.

To correct, true up the manifold flange with a file and replace the gasket.

VAPOR LOCK IN CARBURETOR

Some trouble has been experienced by what has been variously described as missing, surging and stopping entirely after a hard pull or after sustained high speed. This trouble is most common in hot localities and is very often mistaken for coil or condenser trouble. The trouble generally starts as the radiator water temperature approaches 180° F. and continues until in extreme cases the motor will die completely and must be left to cool before it can be started again.

As near as can be determined, this trouble is due to extreme temperature in and around the carburetor and gas line screens. The trouble can generally be corrected by the same method used on Chrysler automobiles. On page 65 will be found under the heading Vapor Lock in Carburetor complete information and suggestions for correcting extreme cases of fuel boiling.

IGNITION TIMING

DeSoto Six 1928-29-30.—The timing procedure for all models of DeSoto Six is the same. That is, all motors are timed entirely by piston travel. No flywheel marks are provided. A hole sealed with a ⅛" pipe plug is drilled and tapped in the cylinder head directly over No. 6 piston. The piston travel gauge Fig. 2 should be inserted through this hole.

Ignition Timing Table

The following table contains complete ignition timing specifications. When tuning the motor, follow closely the timing recommendations given in the tune-up section above.

Year	Model	Con Pt Clear	Ignition Timing		Spark Lever Position	Plug Gap	Firing Order
			Piston Travel	Dead Center Position			
1928	6 Cyl	020"	*030"	B U D C	Adv	027" 030"	1-5-3-6-2-4
1929	6 Cyl	020"	*035"	B U D C	Adv	027" 030"	1-5-3-6-2-4
1930	6 Cyl.	020"	*035"	B U D C	Adv	027" 030"	1-5-3-6-2-4
1930	8 Cyl	022"	*037"	B U D C	Adv	†027" 030"	1-6-2-5-8-3-7-4

*"Red Head" 010" before upper dead center, Cars equipped with North East distributors 037" before upper dead center
†If trouble is experienced by motors cutting out on a hill try setting the spark plug gaps at 022".

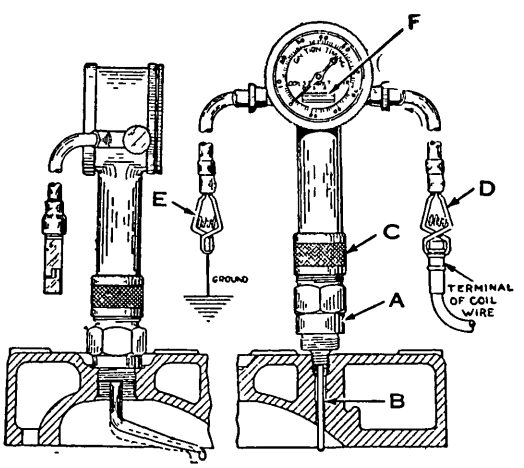


Fig. 2

View of piston timing gauge showing method of timing through either the ⅛" pipe plug timing hole or through the spark plug hole in the cylinder head.

To time the motor, remove the ⅛" pipe plug from the cylinder head and insert the piston travel gauge, after scraping off the accumulation of carbon where the gauge rod strikes the piston head. Crank the motor and observe the travel of the gauge hand. When No. 6 piston is at top dead center of its stroke, the position of the gauge hand on the dial should be noted. This point is also top dead center for No. 1 piston. To get No. 1 piston in the correct position for firing, again crank the motor until No. 1 piston is approaching top dead center of its compression stroke, and stop the piston at the exact timing position as given in the ignition timing table. Also refer to the ignition timing table for correct contact point clearance.

With the piston in this position and the spark lever fully advanced the contact points should just begin to separate with distributor rotor pointing to contact for No. 1 spark plug wire.

Care should be exercised to remove all lash from the distributor drive by exerting a pressure on the rotor against rotation. The exact instant at which the points break contact should be determined either by the use of an ammeter or light bulb in the primary circuit. The ammeter on the car may be used.

DeSoto Eight 1930.—A distributor with two sets of contact points and a four lobe cam is used on eight cylinder models. The stationary set of contacts fire the end bank of cylinders numbers 1-2-8-7 while the movable set fire the center bank numbers 6-5-3-4.

To time the ignition, crank the motor until piston No. 1 is .037″ before top dead center compression stroke, piston gauge measurement (see instructions above for timing procedure). With the piston in this position rotate the distributor housing until the stationary set of breaker contacts just start to separate, with the spark lever fully advanced. For contact point clearance, see ignition timing table above.

To Synchronize Distributor With Four Lobe Cam.—Adjust both sets of contact points to .022″ clearance. It will be noted that one of the two arrows near the spring on the synchronizing tool (K) Fig. 3 points in the direction of distributor rotation.

When the tool is placed on the distributor shaft so that the spring rests in the slot (L) be sure that the arrow near that spring points in the direction of distributor rotation.

Crank the motor until the stationary arm (A) breaks contact and note the graduation in the center of the tool that aligns with either one or the other edge of the slot at the rim of the distributor base as the case may be. Continue to crank the motor until the same graduation on the (M) side of the tool aligns with the same edge of the slot and adjust the points on the movable arm (D) so that they just start to break. Check the clearance as to synchronizing. The clearance should be within the limits of from .018″ to .024″. See ignition timing table.

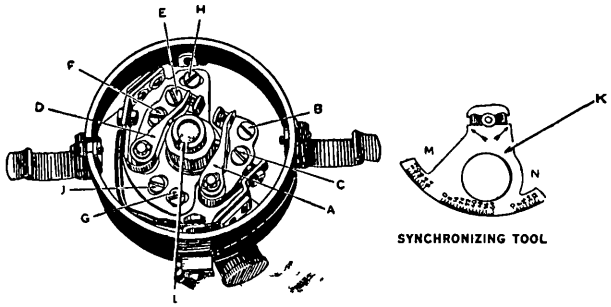


Fig. 3

On DeSoto 8 cylinder models, a distributor with two sets of contact points is used. In order to obtain the best motor performance, these contact points must be accurately synchronized. The cut shows a top view of the breaker box and the synchronizing tool used. See information under heading "To Synchronize Four Lobe Cam Distributor."

VALVE TIMING

DeSoto Six 1928-29-30.—No marks are provided on the flywheel for checking the valve timing. Valve timing is checked entirely by piston travel through a ⅛″ pipe plug hole drilled and tapped in the cylinder head directly over the No. 6 piston.

To time the valves remove the pipe plug and insert the piston travel gauge as shown in Fig. 2. Adjust the tappets of No. 1 cylinder intake valve to .008″ clearance (.011″ on 1930 six cylinder models). The intake valve should just begin to open when No. 1 piston is in the correct timing position by dial gauge as given in the valve timing table. Reset the tappets to the correct running clearance after timing operation is complete.

DeSoto 1930 Eight Cylinder Models.—To check the valve timing, remove the pipe plug from the cylinder head directly over No. 8 piston and insert piston travel gauge. Adjust the intake and exhaust valve tappets for No. 1 cylinder to .011″ and .012″ clearance respectively. Crank the motor until No. 8 piston is coming up on compression stroke and stop when the piston is .035″ past top dead center. At this point No. 1 cylinder intake valve should just start to open. No. 1 exhaust valve closes .010″ past top dead center.

Reset tappets to correct running clearance after timing operation is complete. See valve timing table.

Valve Timing Table

The following table contains complete valve timing specifications. All tappet clearance adjustments should be made with a hot motor unless otherwise specified.

Year	Model	Tappet Adjustment				Valve Timing		
		For Timing		Running		Piston Travel	Int Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
1928	6 Cyl	008″		004″	006″	.014″ A	Opens	
1929	6 Cyl	.008″		.005″	007″	.014″ A	Opens	
1930	6 Cyl	011″		.005″	.007″	014″ A	Opens	
1930	8 Cyl	011″		.005″	.007″	.035″ A	Opens	

A —After top dead center.

TIMING CHAIN ADJUSTMENT

DeSoto 1928-29.—There is no provision for timing chain adjustment. If timing chain has excessive lash, it should be replaced.

GAS LINE SCREENS

DeSoto Six Cylinder Models 1928-29-30.—Came equipped with vacuum tank fuel feed. A fuel filter is located underneath the vacuum tank on the 1929 and 1930 six cylinder models. To clean the filter, remove the sediment bowl and screen. Wash with gasoline and blow clear with compressed air.

A second strainer screen is located at the carbureter. It is important that the strainer screen body be washed out with gasoline and blown out with air.

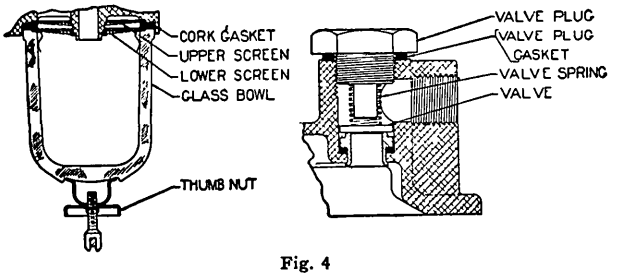


Fig. 4

Cross section view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If valve plug is removed, see that valve plug gasket is in good condition when plug is replaced.

DeSoto 8 Cylinder 1930 Models. — Come equipped with a fuel pump. Two strainer screens will be found in the gas line. One located in the top of the gasoline bowl of the fuel pump Fig. 4 and the other is located in the carburetor (12) Fig. 8.

To clean the fuel pump screen, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged replace with a new one.

When cleaning the strainer screen at the carburetor the strainer screen body should be thoroughly washed out with gasoline and blown dry with compressed air.

Carburetor Specifications

FLOAT LEVEL

Stromberg Carburetors

The float level adjustment for Stromberg carburetors used on DeSoto automobiles may be affected by the type of fuel used.

When carburetors are shipped from the Stromberg factory at Chicago, they are set for fuel (petrol) of specific gravity .7608 to .7368 or 54° to 60° baume. When higher test (lower specific gravity) 68° or 70° baume fuel is used the float level rises and by bending the float arm as indicated the gasoline level is brought back to normal.

A table of float level settings for both high test and low test fuels will be found for Stromberg carburetors in the Chrysler section, page 70.

Stromberg U-1 Carburetor.—The gasoline level when the engine is not running, should stand 9/16" below the top of the float bowl. This adjustment may be made by bending the float lever arm. Bend the arm upward to raise the level and downward to lower the level.

Stromberg Model DX-3 Carburetor.—The gasoline level when the engine is not running should stand 7/8" below the top of the float bowl. Float level adjustment can be changed by bending the float lever arm up to raise the level and down to lower the level.

CARBURETOR SPECIFICATION DIAGNOSIS

The jet specification information for all models of DeSoto is arranged by carburetor model rather than by car model.

To find the carburetor specifications for any particular model of DeSoto first determine the model of carburetor by either referring to the table of specifications under Carburetor Adjustment or by examining the name plate of the carburetor.

STROMBERG CARBURETORS

The carburetor specification information for each model of Stromberg is given under the model heading for each model of carburetor. First will be found the diagnosis information which should enable the mechanic to identify cases of trouble where the carburetor has been thrown out of balance by someone unfamiliar with the correct carburetor adjustment procedure has drilled out or soldered up jets or nozzle openings. Following the diagnosis information for each model of carburetor will be found specification tables giving the correct carburetor calibration specifications for each model of car using this model of carburetor.

How to Read Jet Sizes.—All Stromberg carburetor specifications are given either in wire drill sizes or thousandths of an inch. The main metering jet and economizer by-pass jet used on Stromberg U and D types are the only specifications that are given in thousandths of an inch. All other dimensions are wire drill sizes. Venturi tube measurements are given in fractions of an inch. The table below contains twist drill and steel wire gauge sizes and areas, together with nearest equivalent metric drill sizes.

How to Read Stromberg Model Numbers.—The first letter of a Stromberg model designation indicates the type. The following letter is some special form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor. The size starting from 1" which is No. 1 and increasing in 1/4" steps. For example, take a U-1 type carburetor. This carburetor has a 1" throat while a U-2 has a 1 1/4" throat. The actual diameter of the carburetor opening is 3/16" greater than the nominal rated size in accordance with the standard of the Society of Automotive Engineers.

An "X" in the model symbol indicates that the carburetor flange bolt holes are at right angles to the line of air entrance and the float chamber. The carburetor being usually installed so that the throttle shaft is parallel to the engine crankshaft and the line of the intake manifold. The letter "V"

in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as "TV" or "TXV" as the case may be.

Table of Drill Sizes

The following table contains twist drill and steel wire gauge sizes and areas together with the nearest equivalent metric drill sizes.

Drill No	Dia In	Area, Sq In	Nearest Metric Size MM	Dia In	Area Sq In	Drill No	Dia In.	Area Sq. In	Nearest Metric Size MM	Dia In.	Area, Sq In
1	2280	04082	5 8	2298	04093	41	0960	00723	2 45	0965	00731
2	2210	03835	5 6	2205	03819	42	0935	00686	2 35	0925	00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	0866	00589
5	2055	03316	5 2	2047	03291	45	0820	00528	2 10	0827	00537
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	0807	00512
7	2010	03173	5 1	2008	03167	47	0785	00483	2 00	0787	00486
8	1990	03110	5 1	2008	03167	48	0760	00453	1 95	0768	00463
9	1960	03017	5 0	1963	03039	49	0730	00418	1 85	0728	00416
10	1935	02942	4 9	1929	02918	50	0700	00384	1 80	0709	00395
11	1910	02865	4 9	1929	02918	51	0670	00352	1 70	0689	00352
12	1890	02805	4 8	1890	02803	52	0635	00316	1 60	0630	00312
13	1850	02688	4 7	1850	02688	53	0595	00278	1 50	0591	00274
14	1820	.02601	4 6	1811	02576	54	0550	00237	1 40	0551	00238
15	1800	02544	4 6	.1811	02576	55	0520	00212	1 30	0512	00206
16	1770	02460	4 5	1772	02456	56	0465	00169	1 20	0472	00175
17	1730	02350	4 4	1732	02356	57	0430	00145	1 10	0433	00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	1660	02164	4 2	1654	02149	59	0410	00132	1 05	0413	00134
20	1610	02033	4 1	1614	02046	60	0400	00125	1 00	.0394	00122
21	1590	01985	4 0	1575	01948	61	0390	00119	1 00	.0394	00122
22	1570	01936	4 0	1575	01948	62	0380	00113	95	0374	00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	.00110
24	1520	01814	3 9	1535	01851	64	0360	00101	90	0354	00098
25	1495	01755	3 8	1496	01758	65	0350	00096	90	0354	00098
26	1470	01697	3 7	1457	01667	66	0330	00085	85	0335	00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01452	3 5	1378	01491	69	0292	00067	75	0295	00068
30	1285	01298	3 3	1299	01325	70	0280	00061	70	0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0236	00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	0256	00053
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	.0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00034	55	0217	00037
36	1065	00690	2 7	1063	00887	76	.0200	00031	50	.0197	00030
37	1040	00849	2 6	1024	00824	77	0180	00025	45	0177	.00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00015
40	0980	00754	2 5	0984	00760	80	0135	00014	35	0138	00015

Jet Specification Diagnosis

Stromberg Model U-1.—While the external design of the different types of Stromberg Model U carburetors used on DeSoto may be slightly changed the working principle and internal parts for all types are practically the same. The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments changed.

There are seven places at which the internal adjustments of a Model U carburetor may be changed to affect its operation. When attempting to determine these changes the work should be done in order as given below.

Idling Discharge Jets (Stromberg U-1).—The idling discharge openings, Fig. 5, are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered, but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jet too Large.—If the idling jets are too large the motor will roll and load regardless of how much air is admitted through the idle adjustment; also the motor will have a tendency to idle fast with the throttle completely closed.

Main Metering Jet (Stromberg U-1).—The metering jet or high speed adjustment (B) Fig. 5 controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed ten miles per hour in high gear can be maintained. If the metering jet is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available see level road test page 109.

Diagnosis, Metering Jet too Small.—If the metering jet is too small the car will have a tendency to stall on a light grade when the motor is throttled down to approximately seven or eight miles per hour and then accelerated gradually to about one-quarter throttle.

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of the wrong specification. If after changing the metering jet to a larger or smaller size the trouble still exists or is aggravated the by-pass jet should next be checked.

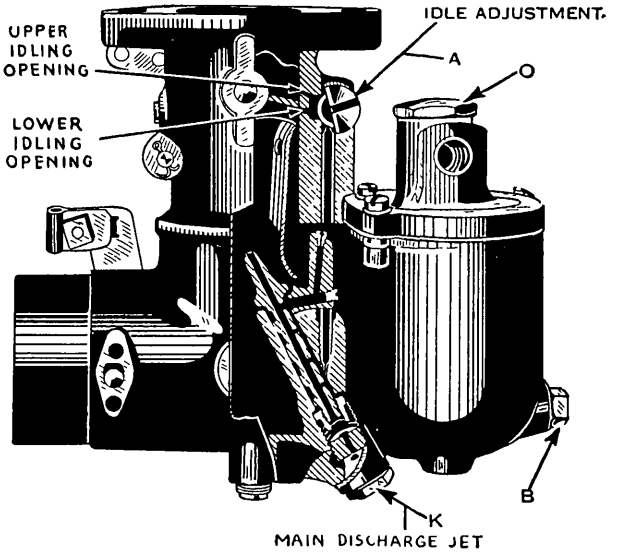


Fig. 5

Cutaway view of Stromberg Model U carburetor used on DeSoto automobiles. The main discharge jet can be removed by unscrewing hexagon plug (K).

By-Pass Jet (Stromberg U-1)—The by-pass jet is shown as the by-pass metering jet, Fig. 7. The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet; namely: the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large.—If the by-pass jet Fig. 7 is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed ten miles per hour in high gear can be maintained. If the by-pass is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. See page 110 for level road test.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult.

Diagnosis, By-Pass Jet too Small.—If by-pass jet is to small the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor, or a condition may exist where, when the throttle is fully opened the car will have a decided flat spot but as the throttle is partially closed the motor will pick up.

A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jet (Stromberg U-1).—It is seldom in actual practice that a large main discharge jet Fig. 6 will have any effect on car performance other than to lower the gasoline mileage. This condition holds true, however, within a certain limit. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. In these cases reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and roll at higher speeds the trouble will probably be caused by a main discharge jet that is too large. This trouble should not be confused with a venturi that is too small. See information below for small venturi.

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet Fig. 6 is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

High Speed Air Bleeder (Stromberg U-1).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore, any changes of the air bleeder should be avoided.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Accelerating Pump (Stromberg U-1).—The pump reducer (pump discharge jet Fig. 7) regulates the flow from the accelerating pump and affects the operation of the carburetor during quick acceleration.

On Model U-1 carburetors with manual controlled by-pass or economizer valve make sure that the roller of the throttle accelerating pump lever is in contact with the pump lever when the throttle is in closed position.

Diagnosis, Pump Discharge Jet too Large or too Small.—If the pump discharge jet is too large the motor will stumble on quick acceleration. If the jet is too small the motor will usually backfire on quick acceleration.

Venturi Tubes (Stromberg U-1).—Two types of venturi tube design are used in Stromberg Model U-1 carburetors. In one type the venturi is cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed. In practice it is seldom that trouble from a venturi of wrong size is experienced. On the interchangeable types the venturi is locked into place by a set screw that may work loose. Before testing for wrong venturi size see that the set screw is tight.

Diagnosis, Venturi too Large.—If the venturi size is too large motor acceleration may be smooth but slow, similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration the motor performance will improve until at high speeds the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small the motor will have good power on acceleration at wide open throttle under 20 miles per hour, but as the car picks up momentum and the load is lightened with throttle still wide open the motor will have a tendency to roll and load. On a level stretch of road with throttle wide open the car will lack speed and gasoline mileage will be poor.

Specification Table.—The following specification tables contain the carburetor specifications for each model of DeSoto using Stromberg Model U:

DeSoto Six 1928-29

(Stromberg U-1 Engine 3" x 4⅛")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#70
Main Metering Jet	.053"	.....
By-Pass Jet	.025"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#60
Pump Reducer	.....	#66
Venturi Tube	15/16"	.....

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #70 wire drill size.

Specification Diagnosis

Stromberg Model DX-3.—While the external design of the different types of Stromberg Model DX carburetors used on DeSoto may be slightly changed, the working principle and internal parts for all models are practically the same. The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments made.

There are seven places at which the internal adjustments of a Model DX carburetor may be changed to affect its operation. When attempting to determine these changes, the work should be done in order as given below.

Idling Discharge Jets (Stromberg DX-3).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered, but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets too Large.—If the idling jets are too large the motor will roll and load regardless of how much air is admitted through the idle adjustment; also, the motor will have a tendency to idle fast with the throttle completely closed.

Main Metering Jet (Stromberg DX-3).—The main metering jet or high speed adjustment (10) Fig. 8 controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the main metering jet is too large, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. For level road test see page 110.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-quarter throttle.

The symptoms produced by a main metering jet of the wrong size may be confused with a by-pass jet of the wrong specification. If after changing the metering jet to a larger or smaller size the trouble still exists or is aggravated, the by-pass jet should next be checked.

Economizer By-Pass Jet (Stromberg DX-3).—The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet, namely, the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet Too Large.—If the by-pass is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. For level road test see page 110.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult.

Diagnosis, By-Pass Jet Too Small.—If the by-pass jet is too small the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where, when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up.

A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jet (Stromberg DX-3).—The main discharge jet on all Stromberg Model DX carburetors are not changeable. By this is meant that the nozzle or jet is not changeable so far as specifications are concerned and under no consideration should these jets be drilled out or changed.

High Speed Air Bleeder (Stromberg DX-3).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeder should be avoided as far as possible.

Diagnosis, Air Bleeder Too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder Too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to the condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In most cases, the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle, a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. Before making the hill test as described above, the car should be tried out under level road conditions.

Accelerating Pumps (Stromberg DX-3).—Accelerating pumps on all Model DX carburetors are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of the screw (6) Fig. 8.

A condition may prevail whereby the pump stroke adjustment is so close that it is difficult to determine whether the stroke is too long or too short. In these cases if shortening the pump stroke improves the motor performance, the stroke was

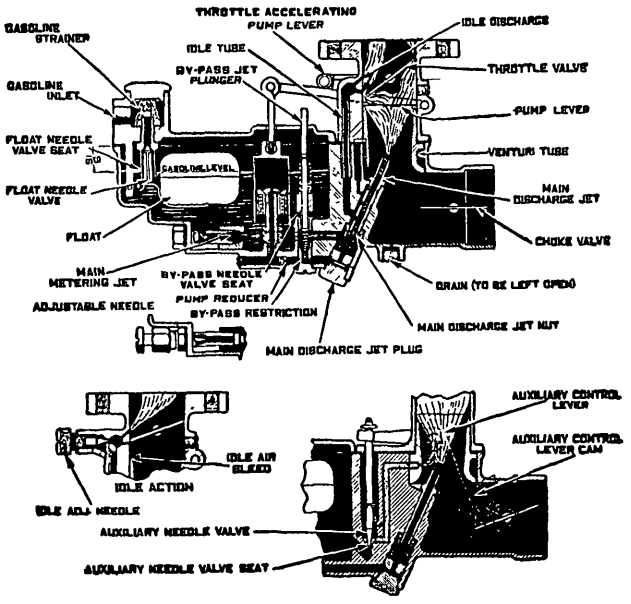


Fig. 5A

Cross section view of Stromberg Model U carburetor with manual controlled economizer. The carburetor by-pass jet plunger is controlled at high speed or when the throttle is fully opened by means of the throttle accelerating pump lever. As shown in the illustration the main metering jet may be either of the set or adjustable type.

too long. But, if the stroke is too short, then shortening the stroke will aggravate the condition. See diagnosis below.

Diagnosis, Pump Stroke Too Short.—If the pump stroke is too short, the car owner may complain that the motor hesitates and stumbles accompanied by sputtering in the carburetor. This condition may also cause the motor to die in traffic on deceleration after a quick acceleration.

To check, first try the car on the service floor by accelerating the motor from idle to high speed several times, always dropping back to idle for at least 10 seconds, each time after speeding up the motor. The object of this test is to get the motor to sputter in the carburetor. The pump stroke setting may be so close that the motor may not sputter for several trials.

If adjustment is so close that the motor will not sputter, try shortening the stroke until the motor does sputter. (If the pump stroke happens to be too long, shortening will improve the motor performance.) After the test is completed, lengthen the pump stroke until the motor smooths out.

Important: After adjustment of the pump stroke is completed, check the car out on a level road.

Diagnosis, Pump Stroke Too Long.—If the pump stroke is too long, the car owner may complain that on acceleration the motor will hesitate and roll, accompanied by an unpleasant jerking followed by the motor smoothing out.

To check, first test the car on the service floor. On quick acceleration, the motor will have a tendency to stumble and roll and on deceleration the motor may run rich for 10 or 15 seconds and even die.

On a road test, the motor will stumble and hesitate on acceleration and then run rich for from 40 to 50 feet. To correct, shorten the pump stroke.

Venturi Tubes (Stromberg DX-3).—All venturi tubes on Stromberg Model DX carburetors are removable and are held into the carburetor body by a set screw and lock nut. In practice it is seldom that trouble from a venturi tube of wrong size is experienced. However, if this trouble is encountered, a check to see that the venturi is tight in the carburetor body should be made before testing for wrong size.

Diagnosis, Venturi Tube Too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speed, the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi Tube Too Small.—If the venturi is too small the motor will have good power on acceleration at wide open throttle under 25 miles per hour, but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Specification Table.—The following specification table contains the carburetor specifications for each Model of DeSoto using Stromberg Model DX:

DeSoto Eight 1930

(Stromberg DX-3 Engine 2⅞" x 4")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	.....
Main Metering Jet	.....	.....
Economizer By-Pass	.....	.....
Main Discharge Jet	.....	.....
High Speed Air Bleeder	.....	.....
Pump Discharge	.....	.....
Venturi Tube	.....	.....

LEVEL ROAD TESTING

The following carburetor test information is given for level localities where hills are not available. The best results, when testing the carburetor, will generally be obtained on a hill test as described in the Specification Diagnosis section for each Stromberg model. The following information should be used only in localities where hills are not available for testing purposes.

Economizer or High Speed Air Bleeder (Stromberg U and DX).—The high speed or economizer air bleeder and main discharge jet have been calibrated to work in perfect balance at the factory; therefore, any change of the air bleeder should be avoided as far as possible.

Diagnosis, Air Bleeder too Small.—If the economizer or high speed air bleeder is too small, the car owner may complain of low gasoline mileage at all car speeds accompanied by a tendency in extreme cases for the motor to Roll and load at low speeds and on acceleration. On a level road test with wide open throttle, the car will lack speed and power and motor performance will be similar to a condition of late ignition timing or retarded spark.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass that is too large.

In most cases the trouble can be checked out by level road test in the following way:

First replace the air bleeder with a large size (not to exceed four sizes larger on the first test). It should be remembered, however, that on some Stromberg models, the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the

trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passage way is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next, take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved when a larger opening is used, but if no change is noticed, or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large the car owner may complain of a tendency for the motor to hesitate on slow acceleration and in some cases the motor may die in traffic. With a wide open throttle, the car will probably lack speed and power accompanied by a gentle popping in the muffler. It should be remembered that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models, the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, turn to the specification table which contains the correct drill size specifications for the particular carburetor model in question. These carburetor specifications will be found in a table at the end of each Specification Diagnosis section, for the particular carburetor model in question. After the correct air bleed wire drill size is known by referring to the table, check to see whether someone unfamiliar with the correct carburetor calibration procedure has drilled out the air bleed opening. If the air bleed opening has been drilled out, it may be necessary in order to correct the trouble, to replace the carburetor body. However, if the air bleeder is of the changeable type, a smaller air bleeder may be used.

In most cases, an air bleeder that is too large can be checked out on level road test by slowly accelerating the car to approximately 25 miles per hour with the spark half retarded. If the air bleed opening is too large, from one to three flat spots will probably be experienced and in some cases accompanied by a popping back of the motor during the period of slow acceleration.

Main Metering Jet (Stromberg U and DX).—The main metering jet or high speed adjustment controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Main Metering Jet too Large.—The car owner may complain of poor gasoline mileage at all speeds with a tendency in some cases for the motor to roll and load. It may also be found that when starting a cold motor, the choke can be released immediately.

In most cases, the trouble can be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the car will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on first test) and test the car again with wide open throttle in second gear. If reducing the metering jet corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor, accompanied in most cases with a loss of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade or on a pull when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-quarter throttle.

By-Pass (Stromberg U and DX).—The purpose of the by-pass jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely: the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small. In the following diagnosis, only the information for a level road test where the by-pass jet is too large will be given. Turn to the diagnosis section, pages 77 to 81, for the particular model of carburetor in question for information on a by-pass valve sticking or a by-pass jet that is too small.

Diagnosis, By-Pass Jet too Large —The car owner may complain of poor gasoline mileage at high speed and a tendency to roll and load on a pull or any condition requiring a wide open throttle.

In most cases where no hill is available that is steep enough for a test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle conditions. When reducing the size of the by-pass jet, the following instructions are recommended: If the by-pass jet in the carburetor is over .040" try five sizes smaller. However, if the by-pass jet in the carburetor is less than .040", try two sizes smaller on first test.

Carburetor Adjustment

Motor Specifications

The following table lists the model and year of car, engine specifications, make model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
					STROMBERG
DeSoto 1928	6 Cyl.	Own	6	3 "x4½"	U-1
DeSoto 1929	6 Cyl.	Own	6	3 "x4½"	U-1
DeSoto 1930	6 Cyl.	Own	6	3 "x4½"	U-1
DeSoto 1930	8 Cyl.	Own	8	2⅞"x4"	DX-3

Two types of Stromberg carburetor were used on DeSoto automobiles to date. One is Stromberg Model U-1 and the other Model DX-3. Figs. 6 and 7 show cutaway views of the Stromberg Model U

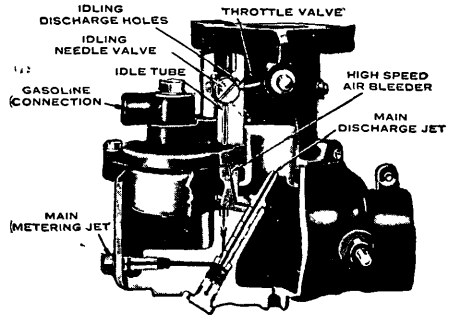


Fig. 6

Cutaway section of Stromberg Model U-1 carburetor used on DeSoto automobile showing the main metering jet, main discharge jet, high speed air bleed and idling adjustment. For a more detailed cross section view of this model of carburetor, see Fig. 19, page 78, of the Chrysler section.

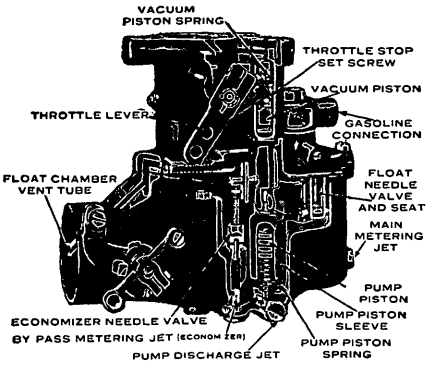


Fig 7

Cutaway section of Stromberg Model U-1 carburetor used on DeSoto automobile showing vacuum piston, throttle stop screw, pump discharge jet, by-pass metering jet and economizer needle valve For more detailed cross section view of this carburetor see Fig 19, page 78, of the Chrysler section

carburetors but a more complete detailed cross section view of this carburetor will be found on page 78, Fig. 19, of the Chrysler section.

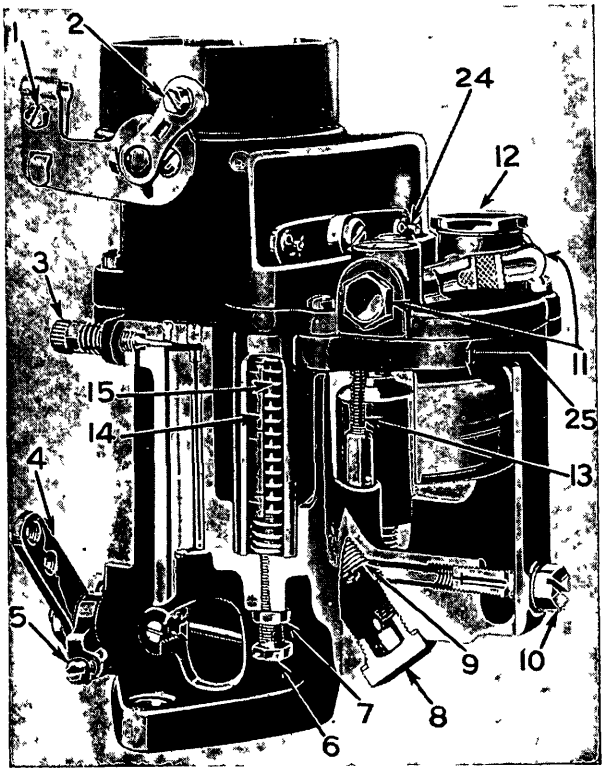


Fig 8

Cutaway section of Stromberg Model DX-3 down draft carburetor used on DeSoto 8 cylinder 1930 models (1) choke control tube holder, (2) choke lever wire clamp screw, (3) idling needle valve, (4) throttle lever, (5) throttle stop set screw, (6) pump adjusting screw (7) vacuum piston stop screw lock nut, (8) main discharge plug, (9) main discharge jet retainer plug, (10) main metering jet, (11) gasoline connection, (12) strainer plug, (13) economizer needle valve, (14) vacuum piston, (15) vacuum piston spring (24) pump piston link (25) float setting

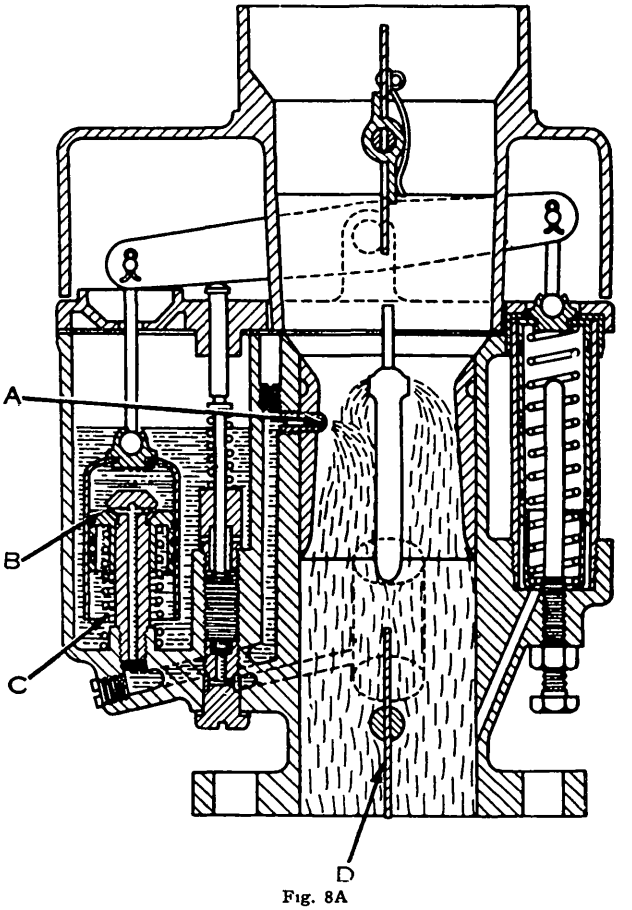


Fig. 8A

Cross section view of Stromberg Model DX down-draft carburetor used on DeSoto automobiles showing the accelerating pump action The throttle valve is shown in the wide open position with the pump delivering an extra charge of gasoline through the pump discharge jet (A).

STROMBERG MODEL U-1

Idle Adjustment (Stromberg Model U-1).—The idle mixture and closed throttle running are controlled by the idle adjustment screw Fig 6.

This operates on air so that turning it clockwise gives a richer mixture and anti-clockwise a leaner mixture. If the engine idles too fast, the throttle stop screw Fig. 7 should be turned to obtain the desired idling speed.

High Speed Adjustment.—The high speed or main metering jet is of predetermined size and is not adjustable. The main metering jet Fig. 6 determines the mixture in the high speed or driving range and should a richer or leaner mixture become necessary due to unusual weather conditions, a metering screw with the correct size opening may be obtained.

Caution: Be sure that the choke butterfly valve opens wide and closes tightly with the corresponding movement of the choke operating wire.

STROMBERG MODEL DX-3

Low Speed Adjustment.—First, have motor well warmed up then with motor idling, turn low

speed adjustment (3) Fig. 8 gradually right or left until steadiest running and fastest running for that throttle position is obtained. This adjustment operates on air so that screwing it in gives a richer mixture, out a leaner one. If motor idles too fast, turn stop screw (5) right or left until the desired idling speed is reached. If motor still does not idle smoothly remove the plug opposite the idle openings and see that the two holes near the lip of the throttle valve are open and clean. Also remove idle tube and see that the small hole in the end is open and that air can be blown through the tube.

Intermediate and High Speed Adjustment.—The mixture at intermediate speeds is controlled by the size of the main metering orifice (10) Fig. 8. The size of this metering orifice is stamped on the outer face of the jet in decimal parts of an inch.

At high speeds with wide open throttle, an additional quantity of fuel is supplied by the by-pass metering jet (20) Fig. 9.

Accelerating Pump Adjustment.—Pump adjusting screw (6) Fig. 8 controls the quantity of fuel delivered by the accelerating pump. In hot weather the accelerating pump discharge may be reduced by turning this screw up or to the right; in winter the quantity may be increased by turning to the left, down. Lock nut (7) should be securely tightened so that adjustment will not change.

If the pump stroke is too short the car owner may complain that on acceleration the motor will hesitate and roll, accompanied by an unpleasant jerking followed by the motor smoothing out. To check, first test the car out on the service floor. On quick acceleration the motor will have a tendency to stumble and Roll and on deceleration the motor may run rich for 10 to 15 seconds and even die.

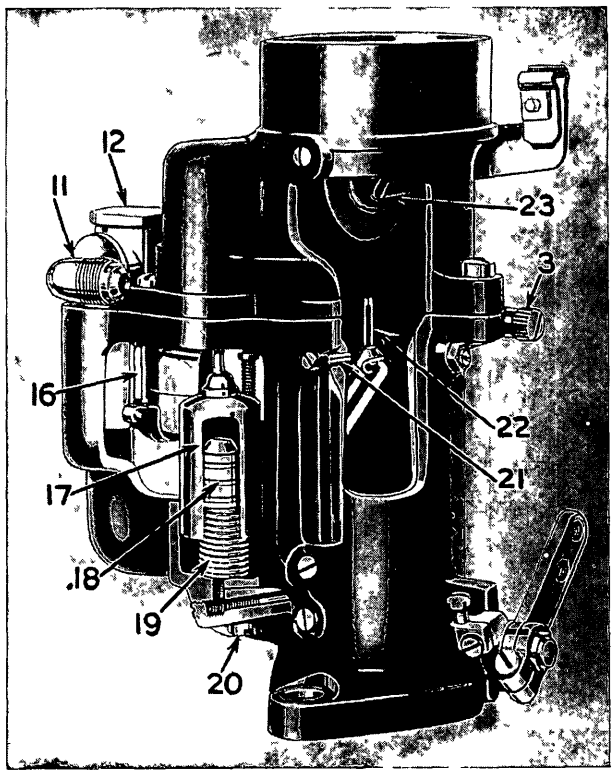


Fig 9

Cutaway view of Stromberg Model DX-3 down draft carburetor used on DeSoto 8 cylinder automobile (16) float needle valve and seat, (17) pump piston sleeve, (18) pump piston, (19) pump piston spring, (20) by-pass metering jet (economizer), (21) pump discharge nozzle, (22) high speed air bleeder, (23) choke valve (flapper type).

On a road test the motor will stumble and hesitate on acceleration and then run rich for from 40 to 50 feet. To correct, shorten the pump stroke.

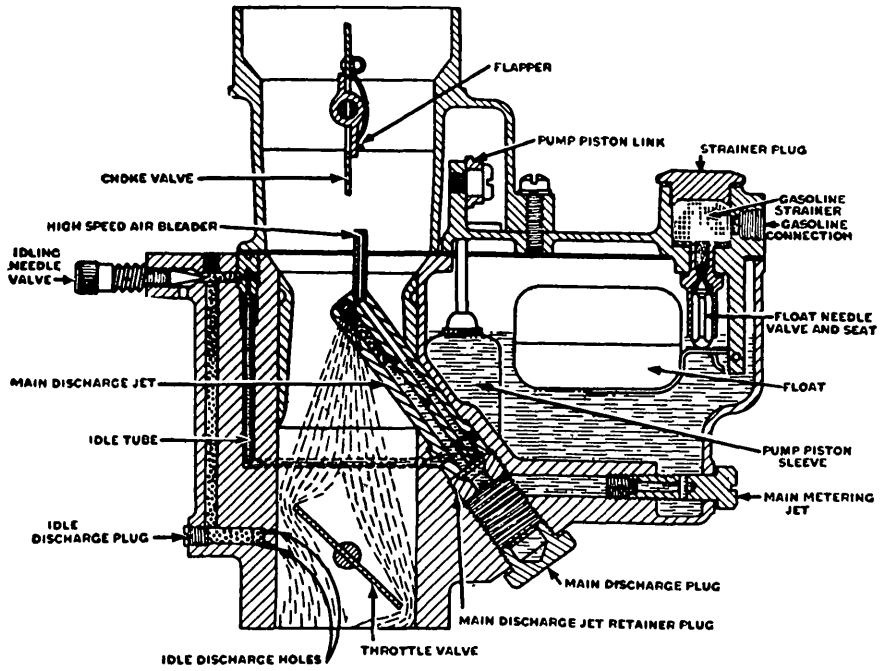


Fig 9A

Cross section view of Stromberg Model DX carburetors used on DeSoto automobiles showing the arrangement of the main discharge and idling jets. The high speed air bleeder for the main discharge jet is mounted in the end of the jet as shown. The main discharge jet for all DX Stromberg carburetors is not changeable as to specifications and under no consideration should the high speed air bleeder or jet discharge holes be drilled out.

If trouble should be experienced at idling speed, remove the idle discharge plug and check to see that the idle discharge holes are not plugged up. The idle discharge holes are made in the body of the carburetor and under no consideration should these holes be drilled out.

In the event that someone unfamiliar with the proper carburetor calibration procedure has drilled out these holes, it is generally necessary to replace the body of the carburetor in order to correct the trouble.

Dodge 1925-30

Motor Tune-Up

Three makes of carburetors have been used on Dodge cars since 1925 and on the late models, two types of ignition are used. When tuning the motor, the mechanic should keep constantly in mind that there are certain conditions of trouble which may develop in the ignition system that are very similar to and may be confused with carburetor troubles. Take for example, those models of Dodge equipped with double contact distributors a condition may develop due to improper setting of the contact points that is liable to be confused with carburetor trouble. Following the motor tune-up operations will be found special information pertaining to motor tune-up that will help the mechanic to avoid confusing and costly mistakes.

While adjustment and service operations on a Stewart carburetor may seem simple enough, unless the mechanic has had considerable experience, there are a number of points with reference to assembling and dismantling a Stewart carburetor that are liable to give trouble unless the proper procedure is followed. Complete information covering these points will be found in the section following the tune-up operations.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
   Note: Dodge 4 Models 124 and 128 have high compression dome type heads. See ignition timing table for distributor and spark plug point clearance.
2. Check timing chain; adjust if necessary.
   Note: This operation applies only to those models equipped with chain driven front ends with manual chain adjustment. (See chain adjustment).
3. Check valve tappets; adjust if necessary.
4. Check ignition timing; adjust if necessary.
   Note: On Dodge 4 cylinder models from 1925 on, all flywheels were stamped with D.C.–1–4 and an ignition timing mark. If the ignition timing mark appears ahead of D.C. the motor should be timed with spark lever fully advanced; if the ignition mark appears after D.C. the motor should be timed with the spark lever fully retarded (see ignition timing). Under no condition should 4 cylinder models with timing inspection hole in housing, be timed by the valves as in previous 4 cylinder models.
5. Check manifold gaskets; see that manifold flange nuts are tight.
6. Clean carburetor and gas line screens.
   Note: On all models equipped with Stewart carburetor, the carburetor should be removed, dismantled and thoroughly cleaned. See that air valve works freely.
7. Check manifold heat control; adjust if necessary.
   Note: This operation applies only to those models equipped with dash manifold heat controls. See that exhaust manifold heat control opens and closes properly. If too much slack in flexible control tube, valve will remain closed when control button on dash is pushed in. If heat control valve remains closed danger of cracking manifold or burning out manifold gaskets.
8. Check fan belt; adjust if loose.
9. Adjust carburetor if necessary.
   Note: On models equipped with Stewart carburetor, if difficulty is experienced in starting or idling of the motor the air valve may be sticking in the guide. Tap lightly on the body of the carburetor; if the motor starts or idling is improved remove the carburetor and clean thoroughly.
   If carburetor jets are dirty, the carburetor should be removed and thoroughly cleaned. Be sure and install new carburetor flange gasket when carburetor is put back on car.

Ragged Idle

Ignition Timing. — When tuning a Dodge motor, particular attention should be exercised to see that the ignition timing is correctly and accurately set. All late models of Dodge are timed by piston travel gauge. (See ignition timing section).

Distributor Points.—When tuning the motor it is important that the distributor points be thoroughly cleaned and squared up. Dirty distributor contacts may create a condition in motor performance very similar to a rich carburetor mixture. The motor will run poorly at low speed and cut out at high speed. On high compression, high speed motors, distributor point clearance is a very important factor in motor performance. See that the distributor point clearance is accurately set. (For ignition timing information turn to Ignition Timing table in the ignition section).

Spark Plug Point Adjustment.—On early four cylinder Dodge models a poor idling condition may be caused by improper adjustment of spark plug point clearance. The spark plug points should be set at approximately from .028″ to .030″. However, care should be exercised not to get the spark plug point gap too wide. If the gap is too wide, a loss of power will be experienced.

Warped Carburetor Flange and Air Leaks.—Failure of motor to idle may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Extreme care should be exercised when bolting the carburetor to the intake manifold to see that both sides come up evenly. The carburetor flange should be checked with a straight edge to see that it is perfectly square. If it is found to be out of true, square up with a mill file.

A poor idling condition may also be caused by air leaks through improperly fitted gaskets or loose manifold flanges. This trouble can be checked out by the use of a squirt can full of gasoline. If motor operation is affected when gasoline is squirted over the flange gasket the trouble will be found to be due to an air leak. Either tighten the flange or replace the gasket.

High Vacuum in Manifold.—A poor idling condition on deceleration may be caused by high vacuum in the manifold above the throttle on cars equipped with Stromberg U and DX carburetors. The car may idle properly on the service floor but when the motor is accelerated to full open throttle

and then decelerated suddenly to full closed throttle, a tendency to roll and load will be noticed. In extreme cases the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct the trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat opposite the idle discharge opening.

Caution: The throttle valve should never be drilled until after all other points have been accurately checked and unless the trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass jet.

Carburetor Air Valve (Stewart Carburetor).—A lean mixture that will prevent a correct idling adjustment may be caused by dirt or grit between the dash pot piston and cylinder wall, thus causing the air valve to stick in the open position. If the trouble is not exaggerated enough to cause the valve to stick open trouble will probably be experienced at all motor speeds. The air valve sticking open may also cause a condition of hard starting.

To determine whether the air valve is stuck in the open position, pull out the carburetor choke and crank the motor. If a pronounced sucking noise is heard the air valve is not stuck open. However, if this noise is not heard the air valve will be found to be in the open position. If the air valve is stuck in the open position a few sharp taps on the carburetor body will generally cause it to settle into position.

To correct a condition of a sticking air valve, remove the carburetor from the car and clean thoroughly. Polish the valve with any good grade of metal polish. Do not use sand paper or any rough abrasive under any consideration.

Bent Carburetor Metering Pin.—A bent carburetor metering pin may cause the air valve to stick and result in a poor idling condition. A bent metering pin is usually the result of careless handling in assembling or dismantling the carburetor.

To correct, replace the bent pin with a new one.

Worn Throttle Shaft.—A poor idling condition may be caused by a badly worn throttle shaft, allowing excessive air to pass into the fuel stream. A badly worn throttle shaft may also make a correct idle adjustment difficult.

To correct, replace with new part.

Pinion Gland Shaft too Tight.—A poor idling condition may be the result of a rich mixture caused by a pinion gland that is too tight on the pinion shaft at the bottom of the carburetor. See Fig. 13. The pinion shaft has a packing gland as shown in the insert which can be tightened to prevent leakage by loosening the lock nut and tightening the gland nut. Care should be exercised when adjusting this gland to see that the nut is not tightened sufficiently to cause the shaft to bind and thus prevent the hand regulated bell crank from coming to rest against the adjusting screw when the dash control button is pushed in.

To correct this condition, loosen the gland.

Carburetor Dash Control Wire too Short.—A poor idling condition may be the result of a rich mixture caused by a dash control wire that is too short. Make sure that the control wire is long enough to force the hand regulated bell crank, Figs. 12 and 13, firmly against the adjusting screw when the control button on the dash is pushed all the way in.

Contact Points Not Properly Synchronized.—On Dodge 8 cylinder models a rough condition of motor operation at idling speed may be caused by the breaker contacts not being properly synchronized. The symptoms are similar to those caused by a too rich carburetor mixture and care should be exercised not to confuse these two conditions.

It is advisable in every case to first check the distributor points as described in the ignition timing section under the heading "To Synchronize Distributors with Four Lobe Cams."

Carburetor.—When tuning up a motor the carburetor is the last unit that should be checked. Do not, under any consideration, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. Follow closely, all recommendations relative to timing given in the paragraphs above. If the trouble is finally traced to the carburetor, first make certain that the carburetor has been properly adjusted. (See carburetor adjustment instructions in the Carburetor Adjustment section).

If the trouble still persists, remove and thoroughly clean all jets and passages. If cleaning and correctly adjusting the carburetor does not eliminate the trouble a poor idling condition may be caused by someone tampering with the idling openings. Turn to idling jets in Carburetor Specification Diagnosis section.

Poor Acceleration

Stromberg Pump Lever Fulcrum Screw.—Failure of motor to accelerate on cars equipped with Stromberg DX carburetors may be caused by the accelerating pump lever fulcrum screw working loose and causing the pump lever to bind.

The car owner will probably complain that the car will accelerate properly at times and at other times it will have a decided flat spot. Correct by tightening the fulcrum screw.

Accelerating Pump (Stromberg Model DX).—Poor acceleration may be the result of too much fuel being delivered from the accelerating pump. If too much fuel is delivered for extreme hot weather even after the pump adjustment is screwed all the way up, proceed as follows:

The pump discharge nozzle (21) Fig. 17 should be changed from a No. 64 to a No. 75. On Dodge 8 cylinder cars beginning with carburetor serial No. 5163907 a No. 64 hole has been drilled in the pump piston (18) through the flat part on the piston head to the inside of the piston. This bypasses a certain amount of fuel and cuts down the amount of fuel delivered during the period of acceleration.

Caution: Do not make both changes in the same carburetor. That is, do not use a No. 75 pump discharge nozzle together with a No. 64 hole in the piston.

Accelerating Pump Adjustment (Stromberg DX).—Pump adjustment screw (6) Fig. 16 controls the quantity of fuel delivered by the accelerating pump on Model DX carburetors. This screw is properly set at the factory for normal operating conditions. In hot weather the accelerating pump discharge may be reduced by turning this screw up or to the right and in winter the quantity may be increased by turning to the left or down. Lock nut (7) should be retightened so that the adjustment will not change. (See accelerating pump information in Carburetor Specification Diagnosis section).

Spark Plug Point Clearance.—Poor motor performance on fast acceleration may be caused by improper setting of the spark plug point clearance. If trouble is experienced by the motor cutting out either on fast acceleration or hard pull recheck the spark plug gap setting. (See ignition timing table).

On early four cylinder model motors the spark plug clearance should not be set closer than from .028″ to .032″.

Lack of Power

Timing.—Of all motor tune-up operations for Dodge cars timing is one of the most important. Lack of power may be caused by either faulty ignition or valve timing. In cases of trouble check both the ignition and valve timing. See timing section below.

Carburetor.—When tuning a motor, the carburetor is the last unit that should be checked. Do not, under any consideration, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. Follow closely all recommendations relative to timing given in the paragraphs above.

If the trouble is finally traced to the carburetor first make certain that the carburetor has been properly adjusted (see carburetor adjustment instructions in the Carburetor Adjustment section).

If the trouble still persists remove and thoroughly clean all jets and passages. If cleaning and correctly adjusting the carburetor does not eliminate the trouble turn to Carburetor Specification Diagnosis.

On cars equipped with Stromberg carburetors lack of power may be caused by the main metering jet, by-pass jet, main discharge jet, high speed air bleed or venturi tube having been changed by someone not familiar with correct carburetor calibration procedure.

On cars equipped with Stewart carburetors, lack of power may be caused by faulty carburetor air valve action. (See information above under the headings Carburetor Air Valve, Bent Carburetor Metering Pin, Pinion Shaft Gland too Tight).

Low Gasoline Mileage

Auxiliary Needle Valve Held Open. (Stromberg Model U).—On cars equipped with Stromberg Model U carburetors low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever, thus holding the auxiliary needle valve open. (See Fig. 19A, page 79 of the Chrysler section).

To correct, set the auxiliary control lever cam so that there is approximately 1/16″ clearance between the cam and the auxiliary control lever. See Fig. 8. Also check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works freely.

Carburetor.—In most cases where low gasoline mileage has been traced to the carburetor, it will be found that the carburetor has not been properly adjusted especially on carburetors having a high speed adjusting needle. (See Carburetor Adjustment section for correct adjustment information).

If someone unfamiliar with correct carburetor calibration procedure has tampered with the carburetor, the trouble may be due to a change in the main metering jet, by-pass jet, main discharge jet, high speed air bleeder or venturi tube of the wrong size.

On cars equipped with Stewart carburetors, low gasoline mileage may be caused by improper functioning of the carburetor air valve. Dirt between the air valve piston and cylinder wall will cause the air valve to stick and interfere with the gasoline mixture. Also, a short dash control wire or a tight pinion shaft gland may cause a tendency to a rich mixture which will lower the gasoline mileage. (See information above).

Motor Loading on a Pull

If trouble is experienced with the motor loading on a pull, first check to see that the carburetor is properly adjusted. On Dodge 8 cylinder models with distributors having double breaker arms, make sure that the ignition is properly synchronized. If the breaker contacts are not properly synchronized, a condition will exist with symptoms similar to those caused by a too rich carburetor mixture and care should be exercised not to confuse these two conditions.

If the trouble is due to the internal specifications of the carburetor having been changed, see Jet Specification Diagnosis in the Carburetor Specification Diagnosis section.

Motor Misfiring

Ignition Distributor.—Motor misfiring may be due to one or more of any of the following causes.

Worn Distributor Shaft.—A worn distributor shaft will cause a faulty and uneven operation of the breaker contacts and in extreme cases will result in a loss of power and a direct miss.

Defective Spark Plug Wires.—Another common cause of motor misfiring and especially on

four cylinder Dodge models is defective spark plug wires. The wires on the four cylinder models are held away from the exhaust pipe by a metal bracket insulated with a fibre sleeve. In service, this bracket becomes very hot and in many instances bakes the spark plug wire insulation, thus causing it to crack and allow the sparks to jump to ground through the brackets.

Care should be exercised when working around the motor not to push any of the wires down against the exhaust manifold where the insulation will be burned or charred.

Poor Distributor Ground.—On early '25 models of Dodge cars a frequent cause of missing can be traced to a poor ground contact between the distributor body and the governor base. This trouble can be overcome by bending the advance arm so that the advance rod binds slightly in the hole in the bell crank. Another method of correcting this trouble is to install a wire with one end attached to the condensor hold down screw and the other end attached to the lower part of the distributor body.

Grounded Distributor Arm.—On cars equipped with double breaker distributors it sometimes happens that through rough handling the fibre on the movable arm is damaged or worn in such a manner that the metal portion of the arm will slip down on the bushing and ground out against the base. When this happens on Dodge Eight models, four cylinders will be shorted out. This trouble can only be corrected by installing a complete new distributor arm.

Motor Noise

Starter Chain.—A noise similar to a loose main bearing may be caused by a loose starting chain. The noise is most pronounced when accelerating the motor under load below 20 miles per hour and usually closing at from between 16 and 18 miles per hour. To correct this trouble, adjust the starter chain.

VAPOR LOCK IN CARBURETOR

In hot localities, trouble may be experienced by what has been variously described as missing, surging or stopping entirely after a hard pull or after sustained high speed. The trouble generally starts as the radiator water temperature approaches 180° F. and continues until in extreme cases, the motor will die completely and must be left to cool before it can be started again.

As near as can be determined, this trouble is due to extreme temperature in and around the carburetor and gas line. In some cases, the trouble can be relieved by venting the carburetor bowl. For more complete information, turn to Vapor Lock in Carburetor, page 65, of the Chrysler Section.

OIL PRESSURE

Model and Year	Min.	Max.
Four, 1925–26	1 lb.	5 lbs.
124, 1927	1 lb.	5 lbs.
Senior 6, 1927–28	5 lbs.	40 lbs.
128, 1928	1 lb.	5 lbs.
Victory 6, 1928	5 lbs.	40 lbs.
Standard 6, 1928–29	5 lbs.	40 lbs.
Senior 6, 1928–29	5 lbs.	40 lbs.
Dodge 6, 1929	5 lbs.	40 lbs.
Senior 6, 1929–30	5 lbs.	30 lbs.
DA 6, 1929	5 lbs.	30 lbs.
DD 6, 1930	5 lbs.	30 lbs.
DC 8, 1930	5 lbs.	30 lbs.

IGNITION TIMING

Dodge, All Four Cylinder Models 1925-28.—The flywheel is stamped with an ignition timing mark "I" which can be observed through the peek-hole in the flywheel housing. If the ignition mark appears ahead of T. D. C. the motor should be timed with the spark lever fully advanced; if the ignition mark appears after T. D. C. the motor should be timed with the spark lever fully retarded.

To time the spark to the motor, crank the engine until No. 1 piston is approaching T.D.C. of compression stroke: Place the spark lever in the proper position as indicated by the location of the ignition timing mark before or after T.D.C.; the contact points should just start to separate when the timing mark registers with the indicator (center of peek-hole) in the flywheel housing. (See ignition data table for contact point clearance and spark plug point setting).

Ignition Timing Table

The following table contains complete ignition timing specifications for all models of Dodge from 1925 to 1930 inclusive. On late model Dodge cars ignition timing is critical especially on those models equipped with double contact distributors. (See ignition timing procedure).

Year	Model	Con. Pt. Clear	IGNITION TIMING			Spark Lever Position	Plug Gap	Firing Order
			Fly-Wheel Travel	Piston Travel	Dead Center Position			
1925	4 Cyl.	.020″	* 8°	.022″	A.U.D.C.	Ret.	.030″	1-3-4-2
1926	4 Cyl.	.020″	* 8°	.022″	A.U.D.C.	Ret.	.030″	1-3-4-2
1927	124	.020″	*12°		B.U.D.C.	Adv.	.030″	1-3-4-2
1927	Senior Six	.020″	*10°	.	B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1928	128	.020″	*12°		B.U.D.C.	Adv.	.030″	1-3-4-2
1928	129 Fast Four	.020″	*12°	.	B.U.D.C.	Adv.	.030″	1-3-4-2
1928	Victory (Ser. 130)	.020″	*10°		B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1928	Standard Six	.020″	* 4°		B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1928	Senior Six	.020″	*10°		B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1929	D. A. 6	.020″	* 4°		B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1929	Senior Six	.020″	*10°		B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1930	New D. D. 6	.020″		†.035″	B.U.D.C.	Adv.	.027″	1-5-3-6-2-4
1930	Senior Six	.020″	.	†.035″	B.U.D.C.	Adv.	.025″	1-5-3-6-2-4
1930	Dodge Eight	.022″	.	†.040″	B.U.D.C.	Adv.	.025″	1-6-2-5-8-3-7-4

*The degree mark for ignition timing is indicated on the flywheel by the symbol "IGN" and may be observed through the peephole in the flywheel housing.

†These engines have no flywheel marks and must be timed by piston travel by the aid of a piston travel gauge.

Dodge, All Six Cylinder Models 1927-29.—To time the spark to the motor, crank the engine until No. 1 piston is approaching T.D.C. compression stroke. With the spark lever fully advanced, the contact points should just begin to separate when the flywheel mark "IGN" registers with the indi-

cator of the peek-hole in the flywheel housing. (See ignition timing table for contact point clearance and spark plug point setting).

Dodge DD-6 and Senior Six 1930.—All late 1930 models of Dodge are designed to be timed by piston travel and so do not have flywheel timing marks. To time the motor, crank the engine until No. 6 piston is entering exhaust stroke. Continue cranking until No. 6 piston is just .035″ piston gauge measurement before top dead center. With the spark lever fully advanced, the contact points should be set so that they just start to open. Adjust the distributor point setting by rotating the distributor body (see ignition timing table for contact point clearance).

Dodge Eight 1930.—The distributor has two sets of breaker points operated by a four lobe cam. The stationary set of points fire the end bank of cylinders 1-2-8-7 and the movable set fire the center bank 6-5-3-4. To time the ignition crank the motor until No. 8 piston is entering exhaust stroke. Remove the pipe plug directly over No. 8 piston and insert a piston travel gauge. Continue cranking the motor until No. 8 piston is just .040″ before top dead center. With the spark lever in fully advanced position the contact points should just start to open. Adjust by rotating the distributor housing (see ignition table for contact point clearance).

To Synchronize Distributor with Four Lobe Cams.—To synchronize the breaker points, adjust both sets of points to .022″ clearance. It will be noted that one of the two arrows near the springs on the synchronizing tool (K) Fig. 1 points in the direction of rotation. Place the tool on the distributor shaft so that the spring rests in the slot (L). Be sure that the arrow near that spring points in the direction of rotation. Crank the motor until the stationary arm (A) breaks contact and note the graduation in the center of the tool that aligns with either one edge or the other of the slot in the rim of the distributor base. Continue to crank the motor until the same graduation on the (M) side of the tool aligns with the same edge of the slot and adjust the points on the movable arm (D) so that they just start to break. Check the clearance after the synchronizing operation is complete. The contact point clearances should be within the limits of from .018″ to .024″.

VALVE TIMING

Dodge, All Four Cylinder Models 1925-28.—To check the valve timing set the tappet clearance of No. 1 exhaust valve at .005″. Crank the motor until No. 1 exhaust valve just closes. At this point the flywheel mark T.D.C. 1-4 should register with the indicator at the peekhole in the flywheel housing.

Dodge, All Six Cylinder Models 1927-29 and Senior 1930.—To check the valve timing set the tappet clearance of No 1 intake valve at .007″. Crank the motor until No. 1 intake valve just begins to open. At this point the flywheel mark

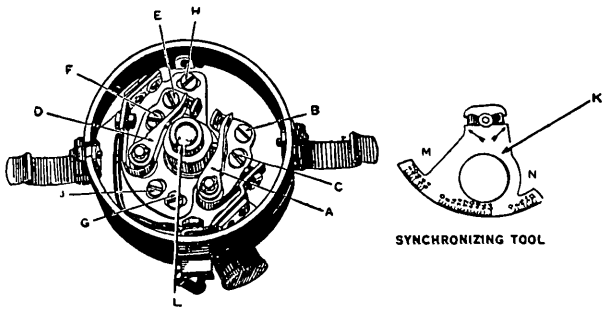


Fig 1

Top view of double contact distributor together with synchronizing tool used on Dodge 8 cylinder motors. Synchronizing the distributor points is one of the most critical operations in the tune-up of a Dodge motor. See synchronizing information.

T.D.C. 1-6 should register with the indicator at the peekhole in the flywheel housing.

Reset valve tappet clearance after timing operation is complete (see valve clearance table).

Valve Timing Table

The following table contains complete valve timing specifications, valve tappet adjustments for all models of Dodge motor cars from 1925 to 1930 inclusive. Valve tappet adjustment for all late Dodge models are critical and should be made with engine idling.

Year	Model	Tappet Adjustment				Valve Timing			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int Valve	Exh. Valve
		Int.	Exh	Int.	Exh				
1925	4 Cyl.			003″	004″	8°	.022″A		Closes
1926	4 Cyl.			005″	006″	8°	.022″A		Closes
1927	124	005″		005″	007″	3° A		Opens	
1927	Senior Six	007″		005″	007″	T D C.		Opens	
1928	128	005″		005″	007″	3° A		Opens	
1928	129 Fast Four	005″		005″	007″	3° A		Opens	
1928	Victory (Ser 1930)	007″		005″	007″	T D C		Opens	
1928	Standard Six	007″		005″	007″	T D C		Opens	
1928	Senior Six	007″		.005″	007″	T D C		Opens	
1929	D. A. 6	007″		005″	007″	T.D C		Opens	
1929	Senior Six	007″		005″	007″	T D C		Opens	
1930	New D D. 6		012″	005″	007″		*025″A		Closes
1930	Senior Six		012″	005″	007″		*025″A		Closes
1930	Dodge Eight		012″	.005″	007″		*010″A		Closes

A —After top dead center. T D C —Top dead center

*All late 1930 Dodge models do not have flywheel timing marks The valves are timed by piston travel by means of a piston timing gauge.

Dodge Model DD-6 and Senior Six 1930.—To check the valve timing set the tappet clearance for No. 1 exhaust valve at .012″. Remove the ⅛″ pipe plug from the cylinder head directly over No. 6 cylinder and insert a piston travel gauge. Crank the motor until the gauge indicates that No 6 piston is .025″ after T.D.C. of the compression stroke. At this point the exhaust valve of No.1 cylinder should have just closed. Reset the tappets to running clearance after the timing operation is complete. (See valve timing table).

Dodge Model DC-8 1930.—To check the valve timing set the tappet clearance of No. 1 exhaust valve at .012″. Remove the ⅛″ pipe plug from the cylinder head over No. 8 cylinder and insert a piston travel gauge. Crank the motor until the gauge indicates that No. 8 piston is .010″ past top dead center of the compression stroke. At

this point the exhaust valve of No. 1 cylinder should have just closed. Reset the tappets to running clearance after the timing operation is complete. (See valve timing table).

TIMING CHAIN ADJUSTMENT

Dodge, All Models with Generator Driven by Timing Chain.—To adjust the timing chain, loosen the bolts that secure the generator support bracket to the timing chain case and swing the generator away from the motor until a chain hum is heard. The generator should then be moved toward the motor until the hum ceases. Tighten the generator support bolts.

GAS LINE SCREENS

All models of Dodge equipped with Stewart vacuum tanks have two gasoline strainers in the gas line. One strainer is located in the top of the vacuum tank (A) Fig. 2, the other is located at the carburetor.

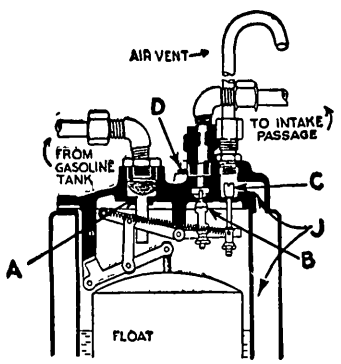


Fig 2

Upper half of vacuum tank showing position of gas line screens. To remove, disconnect the gas line and screw out the hexagon bushing.

All Models of Dodge Equipped with Kingston Vacuum Tanks have a sediment bowl at the bottom of the vacuum tank and a strainer at the carburetor.

To clean gasoline strainers remove and wash with gasoline and air. Wash out strainer body before replacing screen.

All models of Dodge equipped with fuel pumps have gasoline strainers located at two points in the gasoline system. One is a double strainer in the top of the fuel pump bowl and the other is located at the carburetor. To clean the fuel pump strainer screen remove the glass bowl and clean the screen assemblies. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new one. Fig 3.

Carburetor Specifications

FLOAT LEVEL

All float level adjustments for Dodge cars are given by carburetor model rather than by car model. It has been discovered in some localities where various kinds of fuels are used that the kind

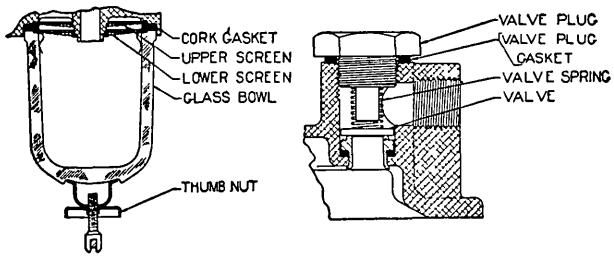


Fig 3

Cross section view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when plug is replaced.

of fuel may affect the float level height and thus interfere with correct carburetor performance. (See float level information below; also see Effect of Fuel on Float Level, page 70).

Carter Carburetors

Model RTO-8.—The float level should measure 11/16" between the machined surface of the casting and the top of the float when the float needle is in the closed position. This measurement should be taken on the side of the float opposite the gasoline intake needle Fig. 4.

Adjustment of the float level may be made by bending the float lever lip that contacts the gasoline intake needle. Bend the lip up to lower the float level and bend it down to raise it.

Stewart Carburetors

It is seldom in service that the float level on Stewart carburetors will be changed unless someone has tampered with the carburetor. If the float level height seems to be changed check the weight which operates the float valve for wear. These weights wear flat in service and may effect the

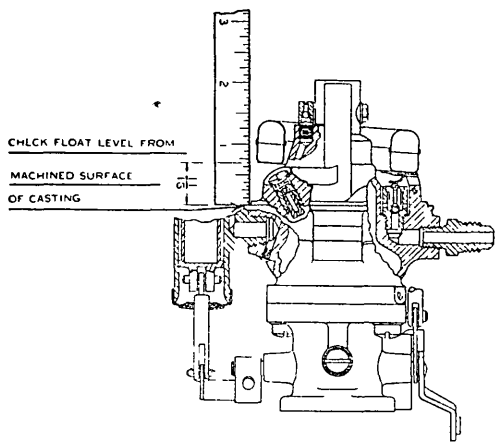


Fig. 4

Sectional view of Carter carburetor Model RTO-8 used on Dodge showing the points at which the float level measurement should be taken. Hold the carburetor upside down so that the float valve is held in the closed position by the carburetor float and take the measurement from the surface of the machined flange to the top of the carburetor float.

float level adjustment. To correct this condition, the weights may be turned over or replaced with new ones.

The correct float level of all Stewart carburetors is approximately ¾" below the top of the float bowl. With the cover off and the measuring scale depressing the float until the gasoline meets the scale. To change this adjustment unsolder the collar on the gasoline needle valve. Moving the collar up lowers the level, moving it down raises the level. Resolder the collar after adjustment.

Stromberg Carburetors

When Stromberg carburetors are shipped from the Chicago factory they are set for fuel (petrol) of specific gravity .7608 to .7368 or 54° to 60° baumé. When higher test (lower specific gravity) 68° to 70° baumé fuel is used the float level rises and by bending the float arm as indicated under float level adjustment in the following paragraphs, the gasoline level can be brought back to normal. A cut Fig. 12A and a table of fuel levels for both low and high test gasoline will be found on page 70 of the Chrysler section.

Model DX-3.—When the engine is not running the gasoline level should stand ⅞" below the top of the float bowl or the float should stand 23/64" from the lower surface or gasket face of the cover, measuring from this point to the top of the float at the center (25) Fig. 16. Adjustment of the float level may be made by bending the float lever arm up to raise the level and down to lower the level.

Model TX-2.—On TX-2 carburetors a plug is provided in the side of the float bowl to determine the height of the float level. With the engine not running, gasoline level in the float chamber should stand even with the bottom of the level sight hole. In order to obtain this fuel level the float should stand 7/32" from the top of the float to the bottom face of the float chamber cover when the float needle is in the seated position. To lower the float level bend float lever arm down; to raise the float level bend the arm up.

Models U-2, U-3, UX-2 and UX-3.—The correct float level with engine not running is 3/32" from the lower surface or gasket face of the float chamber cover to the top of the float at the center. If it should become necessary to change the float level, bend the float lever arm up to raise the level and down to lower the level.

CARBURETOR SPECIFICATION DIAGNOSIS

Carburetor Specification Information.—Three different makes of carburetors have been used on Dodge automobiles from 1925 to 1930 inclusive. To determine what particular make or model of carburetor was used on any given model of Dodge turn to Motor Specifications under Carburetor Adjustment. The jet specification information for each make of carburetor used on Dodge will be found in this section under the carburetor model heading. Instructions on how to use the specifications and determine the correct carburetor calibration is also given under the carburetor heading.

Jet Measurements.—All jets and nozzle measurements for all makes of carburetors used on Dodge cars are measured either in wire drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch and metric drill sizes is given below.

Table of Drill Sizes

The following table contains twist drill and steel wire gauge sizes and areas together with nearest equivalent metric sizes.

Drill No	Dia In.	Area, Sq In	Nearest Metric Size MM	Dia., In	Area Sq In.	Drill No	Dia., In.	Area Sq. In	Nearest Metric Size, MM	Dia In.	Area, Sq In
1	2280	04082	5 8	2298	04093	41	0960	00723	2 45	0965	00731
2	2210	03835	5 6	2205	03819	42	0935	00686	2 35	0925	00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	0866	00589
5	2055	03316	5 2	2047	03291	45	0820	00528	2 10	0827	00539
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	0807	00518
7	2010	03173	5 1	2008	03167	47	0785	00483	2 00	0787	00486
8	1990	03110	5 1	2008	03167	48	0760	00453	1 95	0768	00463
9	1960	03017	5 0	1963	03039	49	0730	00418	1 85	0728	00416
10	1935	0.942	4 9	1929	02918	50	0700	00384	1 80	0709	00395
11	1910	02865	4 9	1929	02918	51	0670	00352	1 70	0689	00352
12	1890	02805	4 8	1890	02803	52	0635	00316	1 60	0630	00312
13	1850	02688	4 7	1850	02688	53	0595	00278	1 50	0591	00274
14	1820	.02601	4 6	1811	.02576	54	0550	00237	1 40	0551	00238
15	1800	02544	4 6	.1811	02576	55	0520	00212	1 30	0512	00206
16	1770	02460	4 5	1772	02456	56	0465	.00169	1 20	0472	00178
17	1730	02350	4 4	1732	02356	57	0430	00145	1.10	0433	00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	1660	02164	4 2	1654	02149	59	.0410	00132	1 05	0413	00134
20	1610	02035	4 1	1614	02046	60	0400	00125	1 00	0394	00122
21	1590	01985	4 0	1575	01948	61	0390	00119	1 00	.0394	00122
22	1570	01936	4 0	1575	01948	62	0380	00113	95	0374	00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	.00110
24	1520	01814	3 9	1535	01851	64	.0360	00101	90	0354	00098
25	1495	01755	3 8	1496	01758	65	0350	00096	90	0354	00098
26	1470	01697	3 7	1457	01667	66	0330	00085	85	0335	00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01452	3 5	1378	01491	69	0292	00067	75	0295	00068
30	1285	01298	3 3	1299	01325	70	0280	00061	70	0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0256	00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	0256	00051
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00 034	55	0217	00037
36	1065	00890	2 7	1063	00887	76	.0200	00031	50	0197	00030
37	1040	00849	2 6	1024	00824	77	0180	00025	45	0177	00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00013
40	0980	00754	2 5	0984	00760	80	0135	00014	.35	0138	00015

CARTER CARBURETORS

The jet specifications for all models of Dodge equipped with Carter carburetors is arranged in tables below by carburetor model rather than car model. To find the jet specification information for any particular model of Dodge determine the model of carburetor by either referring to the table of Motor Specifications under Carburetor Adjustment or by examining the name plate of the carburetor.

In service, carburetors will be encountered where mechanics unfamiliar with correct adjustment procedure have plugged up or drilled out jets. By referring to the tables of specifications below the mechanic will be able to check all jet

sizes. On page 119 will be found a table of drill sizes under the heading Jet Measurements.

Carburetor Specifications

Carter Model RTO-8.—The low speed jet supplies gasoline to the motor at idle engine speed and up to approximately 18 miles per hour, gasoline flowing through a drilled passage connecting low speed jet chamber with carburetor well. At idle, gasoline is drawn through low speed jet and idling ports at the edge of the throttle valve. The idle adjustment screw regulates the amount of air entering this port. Backing out the adjustment screw admits more air and consequently makes idling mixture leaner.

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber. The well jet inside of the body feeds gasoline to the carburetor well. From this well a combination of gasoline and air is drawn into the nozzle chamber through accelerating jets on the side of the nozzle mixing with air from the vertical jet. The combination forming a fine spray which is carried by the standpipe to the venturi or main air passage where it is absorbed by incoming air, forming a mixture on which the engine operates. The jets on the side of the nozzle come into operation in direct proportion to the throttle position because the fuel level in the well is lowered due to increased vacuum as the throttle is opened, thereby uncovering additional jets. As these jet holes open a mixture of gasoline and air passes through whereas at closed throttle position, only liquid gasoline passes through due to the higher fuel level. The further throttle is opened, the more jets are in operation. At wide open throttle all jets are working and the engine is getting the maximum supply.

Carburetor Specifications for Carter Model RTO-8.—The following is a complete table of specifications for Carter Model RTO-8 used on Dodge 1930 automobiles.

To read, hold carburetor intake from you.

Make of Engine: Dodge. No. cylinders: 6. Four cycle. **Bore:** 3⅛ inch. **Stroke:** 4¼ inch.

Carburetor Model: RTO-8. Size 1⅛ inch. Body finish: Duco or equivalent. Brass bowl.

Size of Main Venturi: 1 1/16 inch. Upper well depth from standpipe seat ¼ inch. Lower well, diameter 11/32 inch.

Standpipe: Flare top 7/16 I.D. with 5/16 inch venturi. One No. 49 air hole in base. Two air slots .250 to .254 inch high by .380 to .385 inch wide. Two No. 42 cross holes ⅜ inch from top.

Low Speed Jet: No. 70 drill. By-pass No. 54 drill. Economizer: No. 54 drill.

Float Level: Top of float to be 11/16 inch from machined surface of casting, opposite needle seat.

Accelerating Pump: Type: Low pressure. Stroke: Summer setting 9/32 inch approximately. Winter setting 39/64 inch approximately. Discharge jet size: No. 76 drill. Type: Ball check. Feed to ball check size: No. 45 drill.

Inside Vent: No. 50 drill. Outside vent: None.

Idle Port Opening Above Valve With Valve Tight Closed: .034 inch to .038 inch.

Idle Port: Length: .176 inch. Width: .030 inch. No. 56 drill at top.

Type of Idle: Air bleed.

Main Well Jet: Size: No. 54 drill.

Nozzle: Vertical: No. 48 drill. Top: No. 25 drill.

Accelerating Jets:	Number	Drill Size	Distance from Top of Tube
(Combination No. 70)	4	60	9/16 inch
(Combination No. 70)	2	55	1 5/16 inch
(Combination No. 70)	2	55	1 11/32 inch

Metering Rod: Diameter: Top .070. Bottom .058. Length 4 57/64 inch.

Throttle Lever: Location: Left side. Type: Stamped steel. Length of lever: 1 inch. In center of travel lever points up. To close throttle, move lever from you.

Choker: Location: In venturi. Type: Compensating Cone. Choker lever on left side. In open position points down. To close choker, move lever from you.

Tube Support Bracket: Stamped steel. On air intake.

Gasoline Intake Needle: Square vertical. Needle seat: Standard vertical.

Gasoline Line: Size 5/16 inch. Type of connection: S.A.E.

Gasoline Nipple: Straight. Points straight out.

Remarks: Recommended setting for idle adjustment screw: ¾ to 1¼ turns open. To make mixture richer: Turn adjustment screw in.
Do not idle engine below 300 R.P.M. with spark retarded.

STEWART CARBURETORS

Stewart carburetors were used on early Dodge models. The carburetor is of the metering valve type and consists of the metering valve with a conical shaped head, a stem and a piston. This is the only moving part in the carburetor proper. It slides up and down in its guide formed in the body of the carburetor. The upper part of this valve contains a jet or nozzle and primary air opening. When the engine is at rest, the conical head of the metering or aspirating valve seats in the carburetor body. When the engine is running, however, the metering valve is always floating in some higher position, thereby forming an angular or ring shaped air opening between the conical head and its seat.

There were very few changes made in these carburetors, therefore specification information consists chiefly of a thorough inspection of all parts for wear.

Inspection Instruction.—If the carburetor is dismantled for any reason the following parts should be thoroughly inspected for wear and correct alignment.

1. The air valve should work freely in the main valve guide. If the valve sticks in the guide, the motor will be hard to start and will not idle properly.
2. See that the metering pin is not bent or loose in the rack.
3. If the pinion gear is badly worn, it should be replaced with a new one.
4. Check for worn or leaky valves and seats.

If the mechanic is not thoroughly familiar with a Stewart carburetor, trouble may be experienced when reassembling the units unless the correct procedure is followed. The correct information for

setting the carburetor adjustment when reassembling the units will be found under Carburetor Adjustment. Turn to page 128.

STROMBERG CARBURETORS

The jet specification information for all models of Dodge equipped with Stromberg carburetors is arranged by carburetor model rather than by car model. To find the carburetor specifications for any particular model of Dodge first determine the model of carburetor used as equipment on the car in question by either referring to the table of Motor Specifications under Carburetor Adjustment or by examining the name plate of the carburetor.

All Stromberg carburetor specifications are given either in wire drill sizes or thousandths of an inch. The main metering jet and economizer by-pass jet used on Stromberg U and D types are the only specifications that are given in thousandths of an inch. All other dimensions are wire drill sizes. Venturi tube measurements are given in fractions of an inch.

The carburetor specification information for each model of Stromberg is given under the heading of the carburetor model. First will be found the diagnosis information which should enable the mechanic to identify cases of trouble where the carburetor has been thrown out of balance by someone unfamiliar with the correct carburetor adjustment procedure has drilled out or soldered up jets or nozzle openings. Following the diagnosis information for each model of carburetor will be found specification tables giving the correct carburetor calibration specifications for each model of car using the particular type of carburetor in question.

On page 119 under Jet Measurements a table containing twist drill and steel wire gauge sizes and areas together with their equivalent metric sizes will be found.

How to Read Stromberg Model Numbers.—The first letter of a Stromberg model designation indicates the type, the following letter indicates some special form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor. The size starting from 1″ with the No. 1 and increasing in ¼″ steps. For example, take a U type carburetor. A U-1 has a 1″ throat while the U-2 has a 1¼″ throat. The actual diameter of the carburetor opening is 3/16″ greater than the nominal rated size in accordance with the standard of the Society of Automotive Engineers.

An "X" in the model symbol indicates that the carburetor flange bolt holes are at right angles to the line of air entrance and the float chamber. The carburetor being usually installed so that the throttle shaft is parallel to the engine crankshaft and the line of the intake manifold. The letter "V" in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as "TV" or "TXV".

Specification Diagnosis

Stromberg Model TX-2.—All model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and the high speed air bleed, but all specifications as to principle of operation and jet diagnosis are the same as the Model O.

Idling Discharge Jet (Stromberg TX-2).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jet too Small.—If the idling jets Fig. 5 are too small the motor will roll and load regardless of how much air is admitted through the idle adjustment. Also, the motor will have a tendency to idle fast with throttle completely closed.

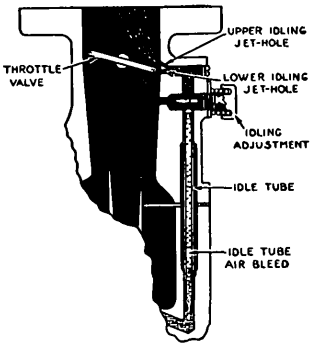


Fig. 5

Cross section of Stromberg TX-2 carburetor used on Dodge showing how the fuel feed through the idling system is increased by passage of the throttle edge across the lower discharge opening.

High Speed Adjustment (Stromberg TX-2).—The high speed adjustment will take care of all ranges within the limits of performance of the carburetor. Very little trouble will be experienced with high speed adjustment from any cause other than wear.

Diagnosis, High Speed Adjustment Parts Worn.—Wearing of the high speed adjusting needle and sockets will cause a variation or irregular running of the motor at speeds above 20 miles per hour. A loss in gasoline mileage may also be noticed.

To check for worn parts, turn the adjustment back and forth and if a looseness can be felt, the parts are worn and should be replaced. (See adjustment information in the adjustment section).

Accelerating Well Bleeder and Discharge Jets (Stromberg TX-2).—If all carburetor adjustments have been correctly made and a noticeable flat spot still exists on quick acceleration, trouble may be due to an accelerating well bleeder or discharge jet of the wrong size.

Diagnosis, Well Bleed too Large.—A well bleeder (A) Fig. 6 that is too large can be indicated by testing the car under quick acceleration on a level road. When the throttle is first opened, the car will accelerate with good power for a short distance and then suddenly hesitate and may backfire.

Diagnosis, Well Bleeder too Small.—To determine whether the accelerating well bleeder is too small, test the car under quick acceleration on a level road.

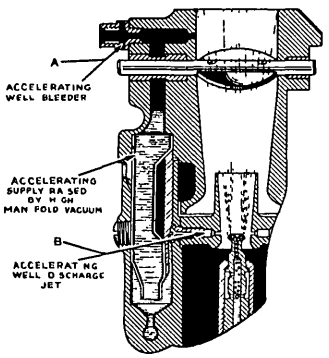


Fig 6

Cross section view of upper portion of Model T Stromberg carburetor showing accelerating well bleeder and accelerating well discharge jet The accelerating well bleeder has two bleed holes of different size, one in each end In summer turn the bleeder so that the large hole is working In winter reverse the bleeder so that the small hole is working

In the first stages of acceleration the motor will have good power but as the car approaches the desired speed, a tendency to load will be noticed

Diagnosis, Accelerating Well Discharge Jets too Large or too Small —If the accelerating well discharge jet (B) Fig 6 is too small the motor will hesitate and backfire on the first stages of acceleration If the accelerating well discharge jet is too large, the motor will load from a rich mixture to the full range of acceleration providing the accelerating well bleeder is small enough to keep up the gasoline supply in the accelerating well However, if the fuel is low in the well, the mixture will be rich in the first stages of acceleration dropping off to a leaner mixture after a short period of wide open throttle

Economizer Needle (Stromberg TX-2) —This needle will seldom give trouble unless someone has tampered with it

Diagnosis, Needle Lift too High —If the needle lift is too high the motor will have a tendency to run rough and may sputter in the carburetor at speeds above 40 miles per hour See Fig 7

Diagnosis, Needle Lift too Low —If the economizer needle lift is too low, a condition of poor fuel economy will result The average needle lift setting is 5/16"

Main Discharge Jet (Stromberg TX-3) —It is seldom in actual practice that a large main discharge jet will have any effect on motor performance other than to lower the gasoline mileage If car performance is good and the gasoline mileage is low, then a smaller discharge jet may be tried

Diagnosis, Main Discharge Jet too Small —If the main discharge jet Fig 7 is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull

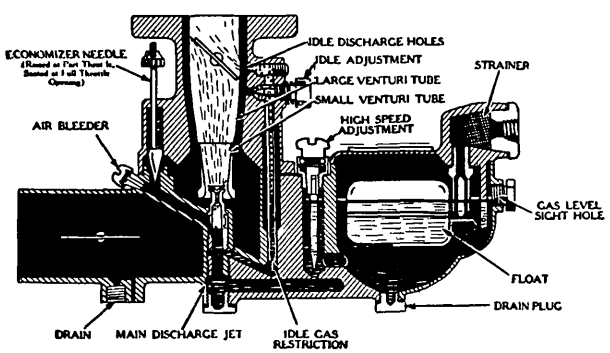


Fig 7

Cross section view of Stromberg TX-2 carburetor used on Dodge cars The illustration is a diagramatic view showing the economizer needle, high speed air bleed and idle discharge opening and adjustment

High Speed Air Bleed (Stromberg TX-2).— The difference between the air bleed arrangement on Stromberg Model T and O is that the O type has the air bleed needle drilled The T type has a separate air bleed and the needle is blank The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance Therefore, any changes of the air bleeder should be avoided

Diagnosis, Air Bleeder too Large (Stromberg TX 2) —If the air bleeder is too large, the trouble may be indicated by sputtering of the motor on fast acceleration or a hesitation on slow acceleration Sometimes at extreme high speed, a gentle popping in the muffler will be produced similar to the exhaust noise when coasting down a hill at a high rate of speed, with the throttle closed and the ignition switch turned on

Diagnosis, Air Bleeder too Small —If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark The motor will be logy on acceleration and at road speeds

In most cases the trouble can be indicated by the same test procedure used to determine whether a main metering jet is too large The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained If the air bleed is too small, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open

Venturi Tube (Stromberg TX-2) —On all model TX-2 Stromberg carburetors the venturi tubes are removable units and are held into the carburetor body by a set screw and lock nut

In practice, it is seldom that trouble from a venturi of wrong size is experienced However, if this trouble is encountered, a test to see that the venturi is tight in the carburetor body should be made before testing for wrong size

Diagnosis, Venturi too Large —If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage

Diagnosis, Venturi Tube too Small —If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open the motor will have a tendency to roll and load On a level stretch of road with throttle wide open the car will lack speed and gasoline mileage will be poor

Specification Table.—The following specification table contains the carburetor specifications for each model of Dodge using Stromberg Model TX-2 carburetor

Dodge Victory 1928

(Stromberg TX-2 Engine 3⅜" x 3⅞")

Description	Wire Drill Size
Idle Discharge Jet	*#55-#70
Accelerating Well Bleeder	†#24-#28
Accelerating Well Discharge Jet	#54
Economizer Needle (with 5/16" lift)	Blank
Main Discharge Jet	‡A-30, B-30
Venturi Tube	1 3/32"

*The idle jet below the throttle is #55 wire drill size, the jet above the throttle is a #70 drill size

†This is a double end bleeder having one end #24 wire drill size and the other end #28 wire drill size

‡First bore of main discharge jet is a #30 drill, second bore is a #30 drill

Specification Diagnosis

(Stromberg Model U and UX)

The jet specification information for all Model U and UX carburetors used on Dodge automobiles is practically the same. Some of the UX type came without the auxiliary control needle for starting. A diagramatic cross section view of Stromberg Model U carburetor with manual control economizer needle is shown in Fig. 8. A cross section view of Model U carburetor with vacuum type economizer will be found on page 78, Fig. 19, of the Chrysler section.

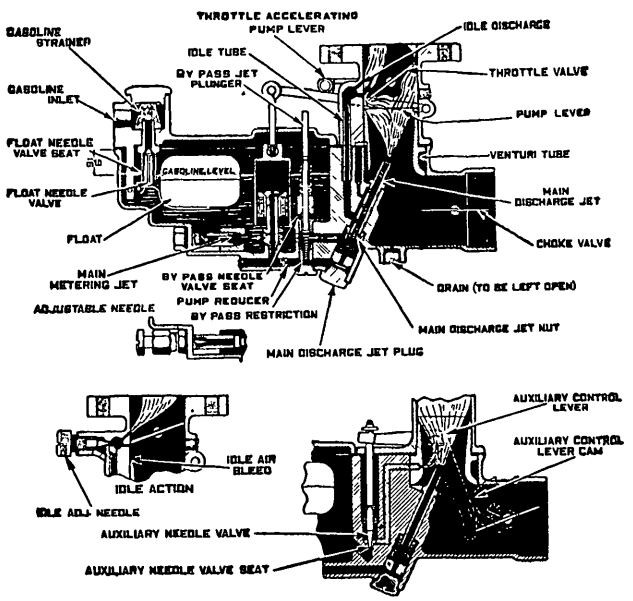


Fig. 8

Cross section diagramatic view of Stromberg Model U carburetor used on Dodge automobiles The main metering jet is set when supplied from the factory but may be changed to an adjustable type The lower sectional views show the idle discharge openings and the auxiliary control lever and needle The control lever cam is shown by dotted lines Complete cross section views of Stromberg Model U carburetor with vacuum economizer will be found on page 78, Fig 19, of Chrysler section.

Stromberg Model U and UX.—While the external design of the different types of Stromberg Model U carburetors used on Dodge may be slightly changed the working principle and internal parts for all types are practically the same. The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments changed.

Occasionally carburetor specifications will be changed by drilling out the jet openings; take for example the idling jets or the air bleeder, in many cases these openings are made in the carburetor body. It is not good practice to drill out these openings since this will necessitate installing a new carburetor body in order to obtain the original correct jet size.

There are seven places at which the internal adjustments of a Model U carburetor may be changed to affect its operation. When attempting to determine these changes the work should be done in order as given below.

Idling Discharge Jets (Stromberg U and UX).—The idling discharge openings, Fig. 8, are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jet too Large.—If the idling jets are too large the motor will roll and load regardless of how much air is admitted through the idle adjustment; also the motor will have a tendency to idle fast with the throttle completely closed

Main Metering Jet (Stromberg U and UX).—The metering jet or high speed adjustment Fig. 8 controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed ten miles per hour in high gear can be maintained. If the metering jet is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available, see Level Road Test, page 82.

Diagnosis, Metering Jet too Small.—If the metering jet is too small the car will have a tendency to stall on a light grade when the motor is throttled down to approximately seven or eight miles per hour and then accelerated gradually to about one-quarter throttle.

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of the wrong specifications. If after changing the metering jet to a larger or smaller size the trouble still exists or is aggravated the by-pass jet should next be checked.

By-Pass Jet (Stromberg U and UX).—The by-pass jet is shown as the by-pass restriction Fig. 8. The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet; namely: the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large—If the by-pass jet Fig. 8 is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed ten miles per hour in high gear can be maintained. If the by-pass is too large a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open

If no hill is available, see level road test, page 82.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult.

Diagnosis, By-Pass Jet too Small.—If the by-pass jet is too small the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor, or a condition may exist where, when the throttle is fully opened the car will have a decided flat spot but as the throttle is partially closed the motor will pick up.

A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jet (Stromberg U and UX).—It is seldom in actual practice that a large main discharge jet Fig. 8 will have any effect on car performance other than to lower the gasoline mileage. This condition holds true, however, within a certain limit. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. In these cases reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and roll at higher speeds the trouble will probably be caused by a main discharge jet that is too large. This trouble should not be confused with a venturi that is too small. See information below for small venturi.

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet Fig. 8 is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

High Speed Air Bleeder (Stromberg U and UX).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore, any changes of the air bleeder should be avoided.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be lo[illegible] on acceleration and at road speeds.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Accelerating Pump, (Stromberg U and UX).—The pump reducer Fig. 8 regulates the flow from the accelerating pump and affects the operation of the carburetor during quick acceleration.

On Model U carburetors with manual controlled by-pass or economizer valve Fig. 8 make sure that the roller of the throttle accelerating pump lever is in contact with the pump lever when the throttle is in closed position.

Diagnosis, Pump Discharge Jet too Large or too Small.—If the pump discharge jet is too large the motor will stumble on quick acceleration. If the jet is too small the motor will usually backfire on quick acceleration.

Venturi Tubes (Stromberg U and UX).—Two types of venturi tube design are used in Stromberg Model U and UX carburetors. In one type the venturi is cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed. In practice it is seldom that trouble from a venturi of wrong size is experienced. On the interchangeable types the venturi is locked into place by a set screw that may work loose. Before testing for wrong venturi size see that the set screw is tight.

Diagnosis, Venturi too Large.—If the venturi size is too large motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration the motor performance will improve until at high speeds the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open the motor will have a tendency to roll and load. On a level stretch of road with throttle wide open the car will lack speed and gasoline mileage will be poor.

Dodge DA 1928-29

(Stromberg U-2 Engine 3⅜" x 3⅞")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#52-#62
Main Metering Jet	.056"	.....
By-Pass Jet	.027"	.....
Main Discharge Jet	.....	.....
High Speed Air Bleeder	.....	#58
Pump Reducer	.....	†#68
Venturi Tube	1 5/16"	.....

†Accelerating pump capacity 10-14 c.c per 10 strokes.

*The idle jet below the throttle is #52 wire drill size. The jet above the throttle is #62 wire drill size.

Dodge 1928-29-30

(Stromberg U-3 and UX-3 Engine 3⅜" x 4½")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54-#56
Main Metering Jet	.070"	.....
By-Pass Jet	.045"	.....
Main Discharge Jet	.....	†A-30, B-28
High Speed Air Bleeder	.....	#56
Pump Reducer	.....	‡#66
Venturi Tube	.....	1⅛"

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #66 wire drill size.

†First bore of main discharge jet is a #30 drill; second bore is a #28 drill.

‡The accelerating pump capacity is 8-12 c.c. per 10 strokes.

Dodge 1928-29

(Stromberg UX-2 Engine 3⅜" x 3⅞")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#54-#70
Main Metering Jet	055"	
By-Pass Jet	046"	
Main Discharge Jet		#40
High Speed Air Bleeder		#56
Pump Reducer		#68
Venturi Tube	1 5/16"	

*The idle jet below the throttle is #54 wire drill size, the jet above the throttle is #66 wire drill size

Specification Diagnosis

(Stromberg Model DX-3)

Stromberg Model DX-3.—The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustment made.

Occasionally carburetor specifications will be changed by drilling out jet openings. Take for example, the idling jet or the air bleeders. In many cases, these openings are made in the carburetor body. It is not good practice to drill out these openings since this will necessitate installing a new carburetor body in order to obtain the original correct jet size.

There are seven places at which the internal adjustment of a Model DX carburetor may be changed to affect its operation. When attempting to determine these changes the work should be done in order as given below.

Idling Discharge Jet (Stromberg DX-3).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jet has drilled out the opening.

Diagnosis, Idle Jet too Large.—If the idling jets are too large, the motor will roll and load regardless of how much air is admitted through the idle adjustment Also, the motor will have a tendency to idle fast with the throttle completely closed

Main Metering Jet (Stromberg DX-3).—The main metering jet or high speed adjustment (10) *Fig. 16 controls the flow of gasoline for speeds* above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle, a car speed not to exceed 10 miles per hour in high gear can be maintained If the main metering jet is too large, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. If no hill is available, see Level Road Test, page 82.

Diagnosis, Metering Jet too Small—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-quarter throttle.

The symptoms produced by a main metering jet of the wrong size may be confused with a by-pass of the wrong specifications. If after changing the metering jet to a larger or small size, the trouble still exists or is aggravated, the by-pass jet should next be checked.

Economizer By-Pass Jet (Stromberg DX-3).—The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely, the by-pass jet may be too large; the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large—If the by-pass jet is too large, the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with throttle still fully open. If no hill is available, see Level Road Test, page 81.

Diagnosis, By-Pass Valve Sticking—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage This trouble may also make a correct carburetor adjustment difficult

Diagnosis, By-Pass Jet too Small—If the by-pass jet is too small, the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle depending upon the individual characteristics of the car A by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up.

A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jet (Stromberg DX-3).—The main discharge jet on all Stromberg Model DX carburetors are not changeable. By this is meant that the nozzle or jet is not changeable so far as specifications are concerned and under no consideration should these jets be drilled out or changed.

High Speed Air Bleeders (Stromberg DX-3).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeders should be avoided as far as possible.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder too Small—If the high speed air bleeder is too small, the car performance on level road test will be similar to the condition of late ignition timing or retarded spark The motor will be logy on acceleration and at road speeds.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. Before making the hill test as described above, the car should be tried out under level road conditions.

Accelerating Pump (Stromberg DX-3).—Accelerating pump on all Model DX carburetors are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of the screw (6) Fig. 16.

A condition may prevail whereby the pump stroke adjustment is so close that it is difficult to determine whether the stroke is too long or too short. In these cases if shortening the pump stroke improves the motor performance, the stroke was too long. But if the stroke is too short, then shortening the stroke will aggravate the condition (see diagnosis below).

Diagnosis, Pump Stroke too Short.—If the pump stroke is too short, the car owner may complain that the motor hesitates and stumbles accompanied by sputtering in the carburetor. This condition may also cause the motor to die in traffic on deceleration after a quick acceleration.

To check, first try the car on the service floor by accelerating the motor from idle to high speed several times, always dropping back to idle for at least 10 seconds, each time after speeding up the motor. The object of this test is to get the motor to sputter in the carburetor. The pump stroke setting may be so close that the motor may not sputter for several trials.

If adjustment is so close that the motor will not sputter try shortening the stroke until the motor does sputter. (If the pump stroke happens to be too long, shortening will improve the motor performance). After the test is completed lengthen the pump stroke until the motor moves out.

Important: After adjustment of the pump stroke is completed check the car out on a level road.

Diagnosis, Pump Stroke too Long.—If the pump stroke is too long, the car owner may complain that on acceleration the motor will hesitate and roll, accompanied by an unpleasant jerking followed by the motor smoothing out.

To check, first test the car on the service floor. On quick acceleration the motor will have a tendency to stumble and roll and on deceleration the motor may run rich for 10 or 15 seconds and even die.

On a road test, the motor will stumble and hesitate on acceleration and then run rich for from 40 to 50 feet. To correct this condition, shorten the pump stroke.

Venturi Tube (Stromberg DX-3).—All venturi tubes on Stromberg Model DX carburetors are removable and are held into the carburetor body by a set screw and lock nut. In practice, it is seldom that trouble from a venturi tube of wrong size will be experienced. However, if this trouble is encountered, a check to see that the venturi is tightened in the carburetor body should be made before testing for wrong size.

Diagnosis, Venturi Tube too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi Tube too Small.—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 25 miles per hour, but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Specification Table.—The following specification table contains the carburetor specifications for each model of Dodge using Stromberg Model DX carburetors.

Dodge Eight 1930

(Stromberg DX-3 Engine 2⅞" x 4¼")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jet		
Main Metering Jet		
Economizer By-Pass Jet		
Main Discharge Jet		
High Speed Air Bleeder		
Pump Discharge		
Venturi Tube		

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. cyl.	Bore and Stroke	Carb. Model and Size
DODGE					CARTER
1930	DD-6	Own	6	3⅛"x4⅛"	RTO8 1⅛"
					STEWART
1925-26	Four	Own	4	3⅞"x4½"	1"
1927	124	Own	4	3⅞"x4½"	1"
1928	128	Own	4	3⅞"x4½"	1"
1928	Victory	Own	6	3⅜"x3⅞"	1¼"
1928-29	Standard	Own	6	3⅜"x3⅞"	1¼"
					STROMBERG
1928	Victory	Own	6	3⅜"x3⅞"	TX-2 and UX-2
1928-29	Standard	Own	6	3⅜"x3⅞"	TX-2 and UX-2
1928-29	Senior	Own	6	3⅜"x4½"	UX-3
1929	DA	Own	6	3⅜"x3⅞"	U-2
1929	Senior	Own	6	3⅜"x4½"	UX-3
1930	Senior	Own	6	3⅜"x4½"	U-3
1930	Dodge Eight	Own	8	2⅞"x4¼"	DX-3

ADJUSTMENT PRECAUTIONS

The adjustment information for carburetors used on Dodge automobiles from 1925 to 1930 inclusive is given by carburetor model rather than by car model. If it is desired to know what make and model of carburetor was used on any particular car model refer to the Motor Specification table above.

Gasoline mileage and motor performance are dependent more than ever before upon a correct carburetor adjustment. Therefore, it is suggested that the information found under Adjustment Precautions be closely observed.

Affect of Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making a range or intermediate speed adjustment. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving as the adjustment is changed and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. This is especially true of the idle and range adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition it will be found that due to the flexibility of adjustment there is a wide range between the points where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Hand Regulator Bell Crank (Stewart Carburetors).—If it should become necessary to remove the bell crank in order to secure a correct adjustment press down against the pinion shaft with force enough to prevent the tension of the spring under the metering pin from allowing the shaft to turn Fig. 13 otherwise this spring tension will cause the shaft to whirl, losing the setting entirely or possibly disengaging the pinion shaft and metering pin rack. Be sure the tension on the hand regulator bell crank spring (K) is sufficient to bring the bell crank to rest against the adjusting screw (D) when the dash control is pushed in all the way.

On all jobs with the carburetor installed on the left side of the motor turning the shaft to the right (clockwise) raises the metering pin, decreasing the flow of gas. Turning it to the left lowers the metering pin and increases the gas opening.

Resetting Hand Control Bell Crank after Carburetor has been Dismantled for Cleaning or Repairs.—If the carburetor has been dismantled for any reason and the hand regulator bell crank (J) has been removed reset in the following way. Turn the pinion shaft (H) to the right until the air valve just lifts off its seat. Then turn to the left until the valve comes to rest on its seat. Continue turning to the left a very small fraction of a turn or until there is a very slight clearance between the upper end of the metering pin and its seat. With the pinion shaft in this position install the bell crank (J). It may be necessary to move the arm a notch or so either way to secure the best result.

Caution: If this procedure is not followed there is danger that the metering pin (L) which has a long taper may be pushed into its seat with such force that it will stick and when an attempt is made to lower it there is danger of breaking it loose from its anchor in the rack (M).

After a cleaning or overhaul job in which the carburetor has been dismantled extreme care should be exercised when readjusting the carburetor. The carburetor and manifold should be thoroughly warmed up and the following points borne in mind. The dash gasoline control does not operate like the ordinary choke valve but works directly on the metering pin. Pulling the choke lever out forces the pin down and admits more gasoline to the main jet. If the carburetor is adjusted too lean the tendency is for the car owner to drive with the dash control pulled out slightly. ⅛" movement out on the dash control is equivalent to several complete turns of the adjusting screw (D). The carburetor should be adjusted to a point of where the motor will operate smoothly when the carburetor and manifold are thoroughly warmed up, with the dash control pushed in all the way.

CARTER MODEL RTO-8

The Model RTO-8 Carter carburetor used on Dodge automobiles is a multiple jet plain tube carburetor of the type usually designated as single adjustment. The fuel at high speed being supplied through a fixed jet while the mixture at low speed is controlled by an adjusting screw. All Dodge Brothers six cars after serial number D-001-WP are equipped with this type carburetor. The low speed jet supplies gasoline to the motor at idle engine speed and up to approximately 18 miles per hour.

For starting and warming up the carburetor is equipped with a venturi choke as shown in Fig. 9.

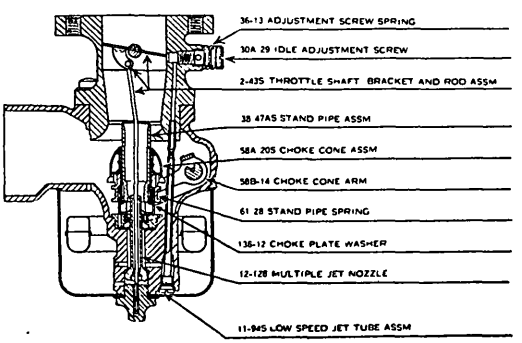

36-13 ADJUSTMENT SCREW SPRING
30A 29 IDLE ADJUSTMENT SCREW
2-43S THROTTLE SHAFT BRACKET AND ROD ASSM
38 47AS STAND PIPE ASSM
58A 20S CHOKE CONE ASSM
58B-14 CHOKE CONE ARM
61 28 STAND PIPE SPRING
136-12 CHOKE PLATE WASHER
12-12B MULTIPLE JET NOZZLE
11-94S LOW SPEED JET TUBE ASSM

Fig. 9

Cross section view of Carter Model RTO-8 carburetor used on Dodge automobiles. The illustration shows a multiple jet nozzle, throttle operated metering pin and venturi choke cone.

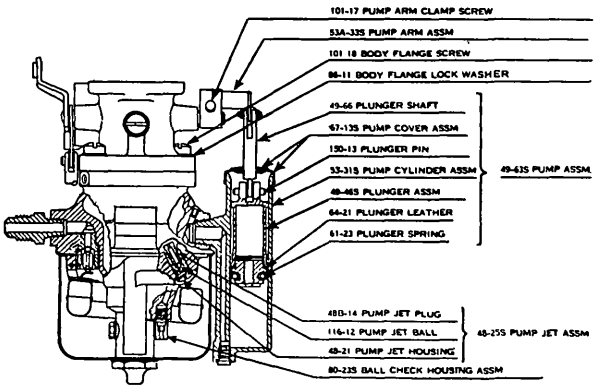


Fig. 10

Cross section view of Carter carburetor used on Dodge 1930 models showing the accelerating pump and pump jet assembly. For more complete information see Accelerating Pump information.

Idle Adjustment.—Open the idle adjustment screw Fig. 9 three-fourths to one and a fourth turns or until engine fires evenly without loading or missing. Turning this screw in gives a richer mixture.

Idle engine speed is regulated by throttle lever adjusting screw. This acts as a stop for throttle lever and prevents throttle valve from closing too tight and allowing engine to stop when accelerator is released.

With hand throttle closed, set throttle lever adjusting screw so car will run about five miles per hour on level road. Throttle lever adjusting screw is locked in the throttle lever by the tension on lugs through which the screw passes. If the screw becomes loose these lugs should be adjusted slightly until proper tension is again obtained.

Accelerating Pump.—The accelerating pump consists of an air chamber and fuel container Fig. 10 added in order to supplement the action of an accelerating well. The pump is controlled by the throttle lever.

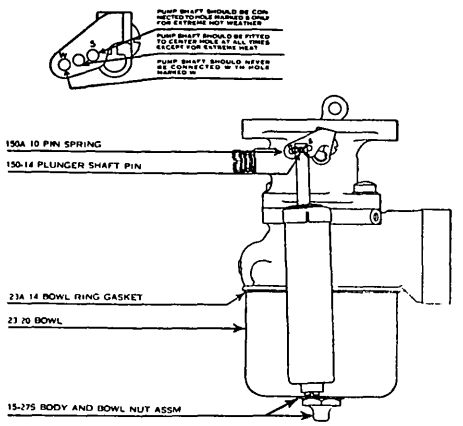


Fig. 11

View of Carter carburetor showing insert of pump lever arm. Three holes are provided in the pump lever arm. The end hold furthest from the pump shaft is for winter driving; the inside hole closest to the pump shaft is for summer driving; for all ordinary purposes, the pump plunger should be connected in the center hole.

When the throttle is closed gasoline is drawn into the pump cylinder through a ball check valve which closes automatically when the throttle is open. Air is compressed in the plunger and a fine spray of gasoline is discharged into the venturi through the pump jets.

A period of about 3 seconds is required to discharge contents of pump supplying the additional amount of fuel required for acceleration by the current motor. The pump arm has three holes as shown in Fig. 11, the hole nearest the pump shaft is marked with the letter "S". The hole furthest away from the pump shaft is marked with the letter "W" while the center hole has no mark. The pump plunger shaft is connected in the center hole of the pump arm when shipped from the factory. The shaft should be connected in the hole marked "S" only in extremely hot weather. The hole marked "W" is for extremely cold weather adjustment in the winter.

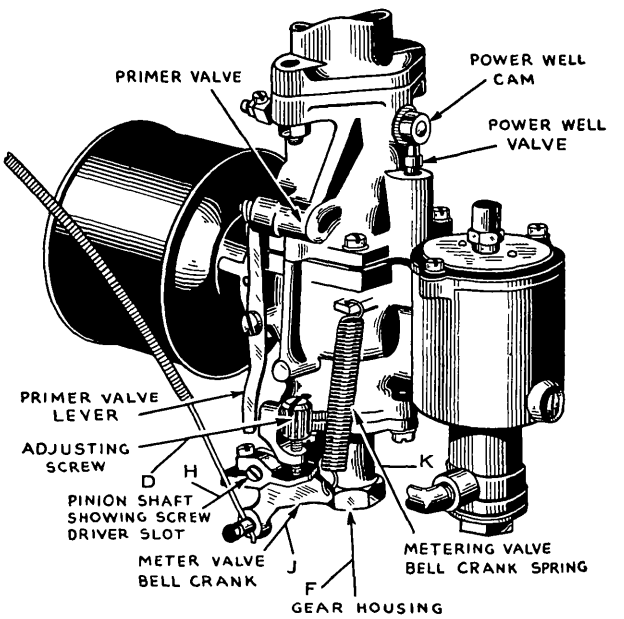


Fig. 12

View of late type Stewart carburetors used on Dodge automobiles showing the carburetor adjusting screw at the bottom of the carburetor, primer valve and the power cam assembly.

STEWART CARBURETORS

A proper adjustment cannot be obtained unless all parts of the carburetor are working properly. If difficulty is experienced in obtaining a correct adjustment see carburetor specifications.

Adjustment.—There is but one point of adjustment (D) Fig. 12 to the carburetor. This adjustment varies the relative height of the metering pin to the opening of the aspirating tube or spray nozzle when the dash control ratchet on the instrument board is in regular running position.

The tapered metering pin (L) Fig. 13 is subject to control within fixed limit by means of the dash

control ratchet located on the instrument board for the purpose of obtaining a rich mixture for starting. Run the engine until it is thoroughly warm. Put spark lever half way down on the sector. Accelerate the engine by opening the throttle quickly. If a "popping" sound is not heard turn the adjusting screw (D) anti-clockwise (up) until a popping sound is heard when the throttle is opened quickly. After the popping sound is heard the screw should be turned clockwise (down) a few notches at a time until the popping is just overcome. The best adjustment will usually be found at this point. It is very important that the spark lever be retarded half way. In some cases it may be necessary to remove and reset the arm on the adjusting shaft if sufficient adjustment cannot be obtained by the travel of the adjusting screw.

Pinion Shaft and Lever Adjustment.—Ordinarily a sufficient range of adjustment can be obtained by means of the screw (D) Fig. 13. In the event, however, that the mixture cannot be made sufficiently lean by turning the screw all the way up or sufficiently rich by turning it all the way down, this condition can be taken care of by shifting the pinion shaft (H) in relation to the lever. To make this adjustment, first mark the present position then loosen the adjusting lever clamp screw (E). With the engine warmed up and running with retarded spark make the adjustment by rotating the pinion shaft by the screw driver slot in its end to the left for lean mixture and to the right for a richer mixture. Then tighten the adjusting arm clamp screw and make final adjustment in the regular manner with the screw (D). It is well to have the adjusting screw (D) in the center of its adjusting range while changing the position of the bell crank arm so that these changes may be made later.

In case the location of the adjustment arm is completely lost it can be restored by the following method: Detach the carburetor from the motor and remove the throttle body or upper half by unscrewing the two cap screws that hold the upper and lower body together. This will expose the metering valve head. Then with the adjusting arm released by loosening the clamp screw (E) and the cap of the gear housing (F) removed the pinion shaft should be turned so that the metering pin will be forced up until it just starts to lift the air valve from its seat. Measurement should then be taken of the distance between the end of the gear housing (F) and the rack which carries the metering pin and slides within the gear housing. This can be done with a narrow scale or set gauge. Next turn the pinion shaft just enough to lower the metering rack down 1/16". Then with the adjusting screw (D) down ½ its travel replace the adjusting arm and clamp it tight by means of the screw (E). This will give an approximate adjustment so that the motor can be easily started. After bringing the motor up to normal temperature the final setting should be made by means of the adjusting screw (D).

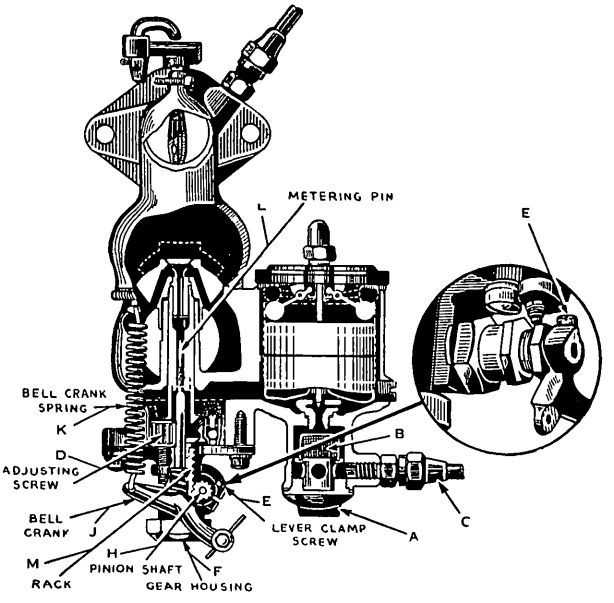


Fig. 13

Cross section view of Model 25 Stewart carburetor used on Dodge automobiles. An enlarged view of the adjustment pinion shaft gland is shown in the insert. If this gland is taken up too tight, trouble will be experienced by failure of the metering pin to work freely.

Caution: Connect the control button wire to the control arm so that the arm stop rests against the adjusting screw with the control button about ⅛" off the dash otherwise a rich mixture will be the result. At normal driving temperature the button should be completely pushed in or depressed. When making adjustment to the carburetor, see that the choke is fully in. Adjusting arm should bear against adjusting screw. If choker wire prevents this, adjustment will not be effective.

STROMBERG MODEL TX-2

Stromberg Model TX-2 used on Dodge motor cars is practically the same in principle and operation as the Model O carburetor with the exception of the high speed air bleed and the float chamber assembly. On the Model T series the high speed air bleed is fixed and the economizer needle is blank, while on the Model O series there is no high speed air bleed orifice other than the one in the economizer needle valve.

Other features which are found on the Model TX-2 carburetor used on Dodge cars is an economizer which permits the carburetor to operate on a very lean mixture at closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the engine is called for. A warming up control which gives easy starting and smooth operation after starting while the engine is cold. A diagramatic cross section view of the Stromberg TX-2 carburetor will be found under Carburetor Specifications, Fig. 7.

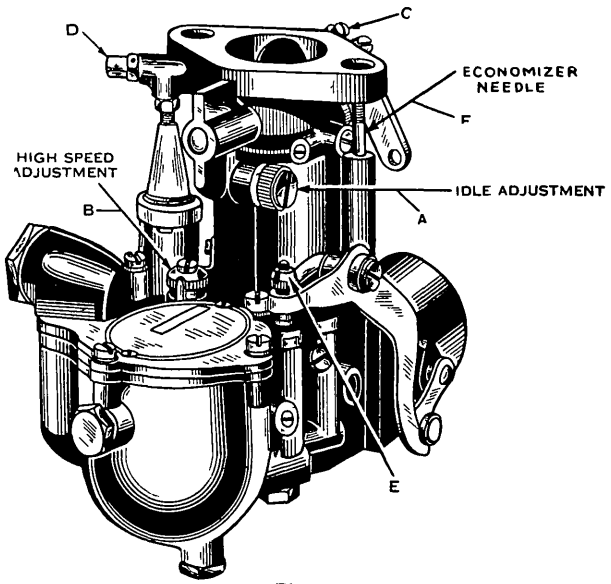


Fig. 14

View of Stromberg TX-2 carburetor used on Dodge automobiles showing high and low speed adjustments. The accelerating well air bleed is shown at (D). This air bleed has one size orifice in one end and another size orifice in the other end. In winter the small orifice should be screwed into the channel. In summer the large orifice should be screwed into the channel. The auxiliary control needle for starting is shown at (E). The economizer needle for high speed operation is shown at (F).

General Adjustment.—If the carburetor has been removed from the car for cleaning or repairs the following are approximate idling and high speed adjustments, which should be obtained to get the car started. The approximate high speed adjustment lifts the needle valve (B) Fig. 14 two and one-half turns (40 notches) from its seat. The low speed adjustment lifts the needle valve (A) one and one-half turns from its seat. These adjustments will usually give a mixture on which the engine can be started, after which finer adjustment may be made but probably will not vary over 2 or 3 notches from the above.

High Speed Adjustment.—To adjust for high speed set the spark lever in full advanced position. Set the throttle lever on the steering wheel to a position which will give about 25 miles per hour speed on a level road. Then turn the high speed adjustment (B) Fig. 14 clockwise which gives less fuel until the engine begins to slow down or Hunt. Then slowly turn it anti-clockwise until the maximum engine speed is reached for that throttle position. This should give a good average adjustment. Several notches less opening may give better economy for continuous driving or touring and a few notches more may be better for short runs in cold weather when the engine does not reach normal temperature.

Low Speed Adjustment.—To adjust for low speed after the high speed adjustment has been made, slow the engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached. Then turn the low speed adjustment (A) Fig. 14 gradually right or left until the steadiest and fastest running for that throttle position is obtained. This adjustment operates on air so that turning it clockwise gives a richer mixture, anti-clockwise a leaner mixture. If after this adjustment is made the engine idles too fast, turn the small throttle stop screw (C) anti-clockwise to reduce the minimum throttle opening until the desired idling speed is reached. If the engine idles too slow, as shown by its "Rolling" and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed. When the engine is idling properly, there should be a steady hiss in the carburetor. If the hiss is unsteady, the accelerating well bleeder (D) may be stopped up with dirt or the auxiliary control needle (E) may not be seating properly. To idle steadily on present day fuel, the gap between the spark plug points must be adjusted properly (see ignition timing table in timing section).

STROMBERG MODEL U AND UX

The adjustments for all Model U and UX carburetors used on Dodge automobiles is practically the same. Some of the UX type came without the auxiliary control needle for starting. On these models, it is necessary to use an economical adjustment of the carburetor for normal running and then use the choke to give the required richer mixture for starting and until the engine reaches an efficient operating temperature.

The choke control in the first part of its travel on the UX-3 Stromberg which does not have the auxiliary starting needle furnishes a driving adjustment during the warming up period. Full choke is necessary for starting in cold weather only.

Starting.—When the engine is cold open the throttle lever on the steering wheel slightly until the accelerator button can be felt to move downward. Turn on the ignition switch and simultaneously depress the starter button and pull out choke control all the way from one to five seconds. As the motor begins to fire, return the control slightly, also open the throttle a little further; that is, if the engine is very cold. Do not crank engine with the choke control all the way out more than 15 seconds continuously as this floods the carburetor unnecessarily. Stopping a moment will allow the unvaporized gasoline to drain out.

For hand cranking in cold weather, open the throttle as above described and pull up the choke control button all the way during two or three turns of the crank. Then return the control about ¼ of the way and give the crank several more turns when the engine should start. When using the hand crank, see that the spark is retarded.

If trouble is regularly experienced in starting make sure that the choker valve in the carburetor air intake shuts tightly when the control button on the dash is all the way out. Always be sure that the choke valve is wide open and the auxiliary

control needle on those models so equipped is securely seated during normal driving.

High Speed Adjustment.—The high speed setting is non-adjustable. The main metering orifice (B) Fig. 15 is calibrated at the factory to supply the correct amount of fuel for high and intermediate speeds of the engine, and should not need changing. If trouble is experienced from motor performance at high speed and the trouble has been traced to the carburetor see main metering jets in the Carburetor Specification Diagnosis section.

Low Speed Adjustment.—To adjust for low speed, slow the engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached. Then turn the idle speed adjustment (A) Fig. 15 gradually to the right or the left until steadiest and fastest running for that throttle position is obtained. This adjustment operates on air so that turning it clockwise gives a richer mixture, anti-clockwise a leaner mixture. If after this adjustment is made the engine idles too fast, turn the throttle stop screw anti-clockwise to reduce the minimum throttle opening until the desired idling speed is reached. If the engine idles too fast as shown by rolling and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed. When the engine is idling properly there should be a steady hiss in the carburetor. If the hiss is unsteady the idling opening may be stopped up with dirt or the auxiliary control needle (on carburetors equipped with this device) may not be seated properly. Check to see that the choke valve is fully open when the dash control is pushed in all the way. To idle steadily on present day fuel, the spark plug gap must be correctly set (see ignition timing table in the timing section).

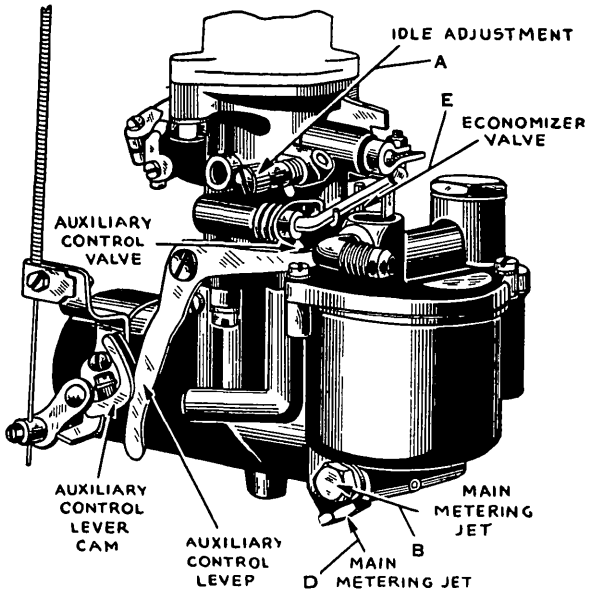


Fig. 15

View of Stromberg UX carburetor used on Dodge automobiles The high speed adjustment on these carburetors when shipped from the factory are set but may be changed for the adjustable types.

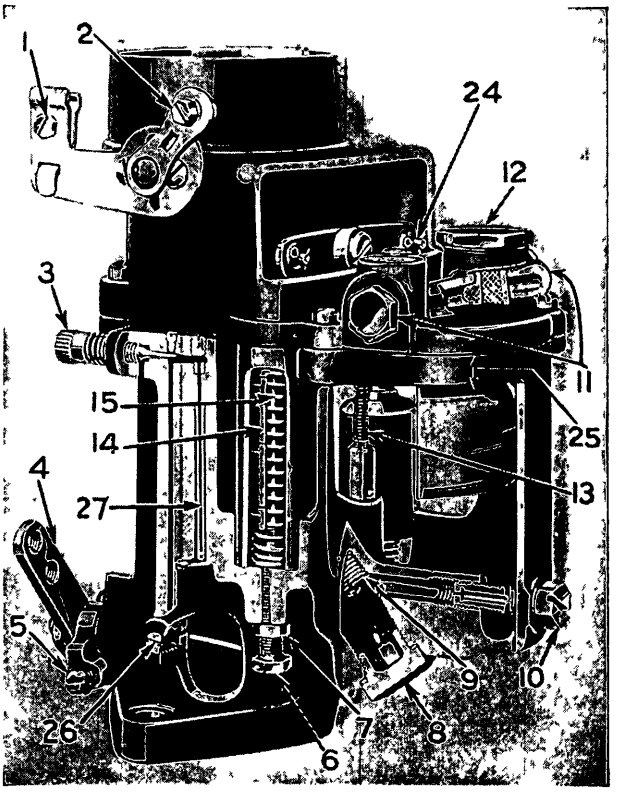


Fig 16

Cutaway view of Stromberg DX-3 carburetor used on Dodge automobiles showing (1) choke control tube holder, (2) choke lever wire clamp screw, (3) idling needle valve, (4) throttle lever, (5) throttle stop set screw, (6) pump adjustment screw, (7) vacuum piston stop screw lock nut, (8) main discharge plug (9) main discharge jet retainer plug, (10) main metering jet, (11) gasoline connection (12) strainer plug, (13) economizer needle valve (14) vacuum piston, (15) vacuum piston spring, (24) pump piston link, (25) float setting (see instructions), (26) idle discharge plug, (27) idle tube

STROMBERG MODEL DX-3

This carburetor is a plain tube down draft type used on late models of Dodge.

Starting and Warming Up.—For starting in cold weather open hand throttle about one-third. Throw on the switch, pull the choker out all the way and step on the starter button. Pull the choker out (control on dash) all the way until the engine starts, then open choker (push in control) slowly and close the throttle slightly until the engine is running at a fairly fast speed. Adjust the choker until the engine runs smoothly and allow the engine to warm up slightly before attempting to drive. When the dash control is all the way out, it is the signal that the choke valve in the carburetor entrance is closed completely. For starting with the engine warm, open the throttle to about 30 miles an hour starting speed.

Turn on the switch and step on the starter. If a start is not made immediately, pull choker control out for an instant only and immediately push choker control in again to normal position.

Low Speed Adjustment.—The carburetor should carry the correct adjustment when delivered from the factory. If the adjustment has been tampered with, it may be restored as follows: Have the engine well warmed up so that the intake pipe and carburetor are at least warm to the hand. Then slow the engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached. Turn the low speed adjustment (3) Fig. 16 gradually to the right or left until the steadiest and fastest running for that throttle position is obtained. This adjustment operates on air so that screwing it in gives a richer mixture and out a leaner mixture. If after this adjustment is made the engine idles too fast, turn the small throttle stop screw (5) anti-clockwise to reduce the minimum throttle opening until the desired idling speed is reached. If the engine idles too slow, as shown by its rolling and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed. If after everything has been checked it is still impossible to get a satisfactory idle, remove the plug (26) and see that the two holes near the lip of the throttle valve are open and clean. Also, remove idle tube (27) and see that the small hole in the end is open and that the air can be blown through the tube.

Intermediate Speed.—The mixture at intermediate speed is controlled by the size of the main metering orifice (10) Fig. 16. The size of this metering orifice is stamped on the outer face of the jet in decimal parts of an inch. This metering orifice has been calibrated at the factory to supply the proper amount of fuel and should not be changed without special instructions. (See main metering jets page 125 in the section covering Carburetor Specification Diagnosis). At wide open throttle an additional quantity of fuel is supplied by the by-pass metering jet (20) Fig. 17.

Accelerating Pump Adjustment.—The action of the accelerating pump on Stromberg Model DX-3 carburetors is controlled by the length of the pump stroke or the pump piston travel. Pump adjustment screw (6) Fig. 16 controls the quantity

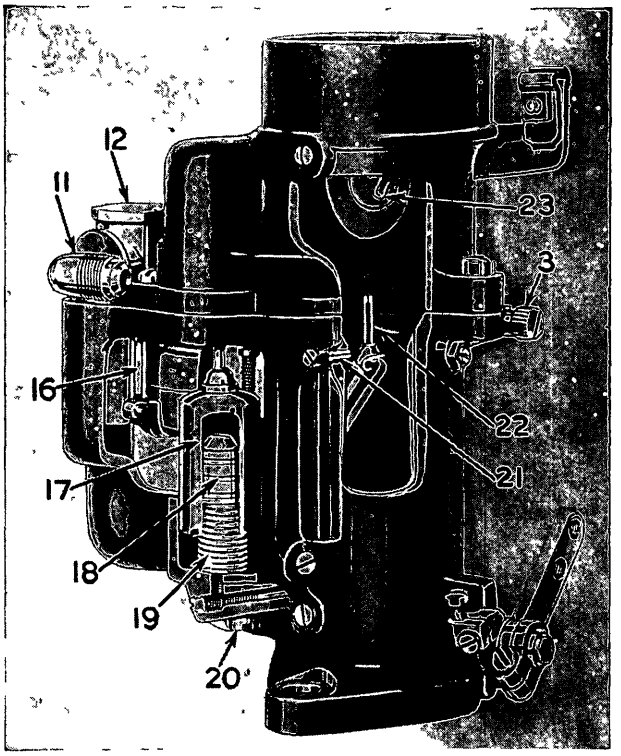


Fig 17

Cutaway section of Stromberg Model DX-3 carburetor used on Dodge models showing (16) float needle valve and seat, (17) pump piston sleeve, (18) pump piston, (19) pump piston spring (20) by-pass metering jet (economizer), (21) pump discharge nozzle, (22) high speed air bleeder (23) choke valve (flapper type)

of fuel delivered by the accelerating pump. This screw is properly set at the factory for normal operating conditions. In hot weather the accelerating pump discharge may be reduced by turning this screw up or to the right and in winter the quantity may be increased by turning it to the left or down. Lock nut (7) should be retightened so that the adjustment will not change.

If difficulty is experienced in obtaining a correct accelerating pump adjustment, it may be possible that someone unfamiliar with the correct adjustment procedure has changed the pump discharge nozzle (21) Fig. 17.

If this should be the case, turn to Accelerating Pump page 126 of the Carburetor Specification Diagnosis section.

Durant 1928-30

Motor Tune-Up

The most important operations in a Durant motor tune-up are ignition timing, spark plug gap setting and distributor point adjustment.

If difficulty is experienced at idling speeds on cars equipped with Tillotson carburetors, check for defective by-pass tube (see Auxiliary By-pass Tube in section following Tune-Up Operations).

The carburetor is the last unit that should be checked. All other adjustments such as timing, spark plugs and contact point settings should be made before changing or adjusting the carburetor.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: Care should be exercised not to get the timing chain too tight. Adjust the chain to a point just below a hum. If timing chain is loose, proper results cannot be obtained when timing the motor.
3. Check the ignition timing; adjust if necessary.
4. Adjust the valve tappets and free up valves.
5. Clean gas line strainers and screens. Also check gas lines for loose fittings.
6. Check fan and generator belts. Adjust if necessary.
7. Tighten water pump nut. This operation is only necessary when packing gland is leaking.
8. Adjust carburetor; clean if necessary.
9. Road test car.
   Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Ignition Timing.—A condition of poor idle may be caused by the ignition timing being advanced too far. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speed.

Spark Plug Gap.—A poor idling condition on Durant motors may be caused by spark plug gaps being set too far apart. The recommended setting is .027″ for all models of Durant.

Distributor Points.—When tuning a motor it is important that the distributor points be thoroughly cleaned and squared up. Dirty distributor contacts may create a condition in motor performance very similar to a rich carburetor mixture condition. The motor will run poorly at low speed and cut out at high speed.

High Vacuum in Manifold.—A poor idling condition especially noticeable on deceleration, may be caused by a high vacuum in the manifold over the throttle on Durant cars equipped with Stromberg Model U carburetors. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to load and Roll will be noticed. In extreme cases the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct this trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16″ in toward the center of the carburetor throat opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless the trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass.

Auxiliary By-Pass Tube Defective.—If trouble is experienced in obtaining an idling adjustment on Tillotson carburetors used on Durant cars, the trouble may be caused by a defective or split auxiliary by-pass sleeve (A) Fig. 9. A poor idling condition may also be caused by dirt collecting in the bottom of the auxiliary by-pass or idling tube (B). If the trouble should be caused by dirt in the bottom of the idling tube, see that the filter screen around the bottom of the tube is thoroughly cleaned.

In the operation of forming the auxiliary by-pass sleeve (A) Fig. 1 the end of the sleeve may crystallize and split or fold under when the by-pass tube is seated. Invariably a leak at this point will cause the air vent chamber surrounding the tube proper to flood and proper air bleed is prevented.

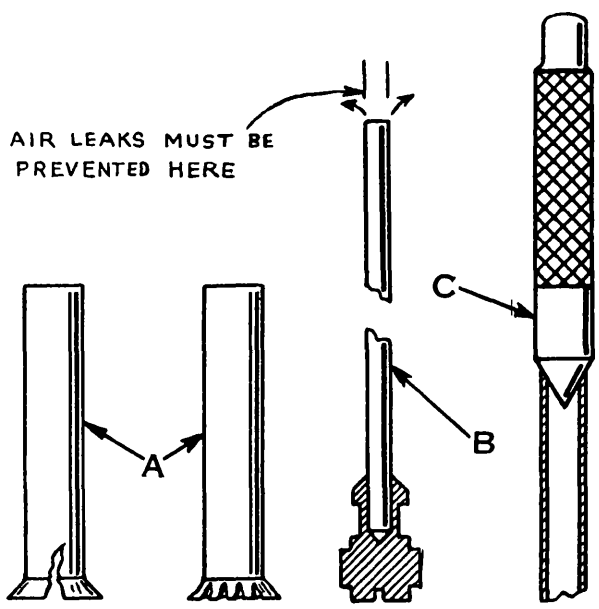


Fig. 1

Showing method of flaring by-pass tubes used on Tillotson carburetors In the left hand view (A) two by-pass tubes are shown, that were damaged in flaring or during the operation of installation. When the by-pass tubes are damaged in this manner carburetor operation will be affected. View (C) shows method of flaring the by-pass tube with a flaring tool.

Extreme care should be exercised in the fitting of by-pass tube. By fitting we mean the clearance between the hole in the upper half of the carburetor body casting and the outside diameter of the by-pass tube.

When air is allowed to leak at the point immediately on top of the tube the mixture is thinned and the low speed adjustment is rendered inoperative in proportion to the amount of air which passes around the tube. (See (B) Fig. 1). By using a small tapered punch (C) having a point angle of 30° those tubes found to be undersize can be flared as desired.

Lack of Power

Improper Adjustment of the Metering or Economizer Needle.—Lack of power at high speeds on all models of Durant equipped with Tillotson SP and V types of carburetors may be caused by improper adjustment of the economizer or metering needle (A), Fig. 2. The nut (A) which is pinned to the lift needle (B) can be adjusted when necessary. This adjustment should allow a lift and fall of approximately 3/32". The clearance between the bottom of the nut and the contact point of the lever fork should be about .040". In replacing cotter pins be sure that the ends of the pins after being bent do not ride or touch the body casting thus interfering with the free action of the lift and fall of the needle.

Low Gasoline Mileage

Auxiliary Needle Valve Held Open.—On cars equipped with Stromberg Model U carburetors, low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever thus holding the auxiliary needle valve open.

To correct, set the auxiliary control lever cam so that there is approximately 1/16" clearance between the cam and the auxiliary control lever.

Also check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works freely.

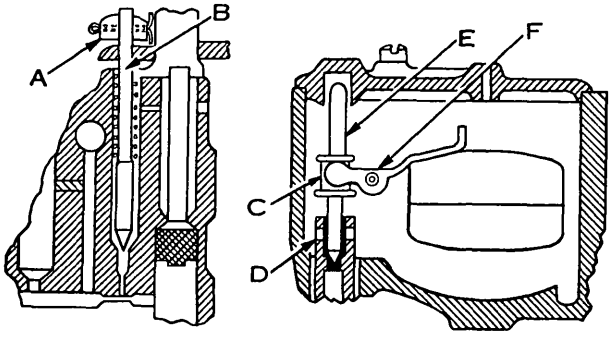


Fig. 2

The left hand view is a cross sectional illustration of the auxiliary lift needle used for starting on Tillotson carburetors. The lift of the needle can be regulated by the nut (A). The right hand view is a cross section of the float and needle valve assemblies used on Tillotson carburetors. To adjust the float level, raise or lower the bushing (C) on the float needle (E).

Gasoline Leaks

Loose Main Nozzle (Tillotson Carburetors).—A gasoline leak which may be confused with a leaky float valve may develop on all models of Tillotson used as equipment on Durant cars. The trouble is generally indicated by a slow dripping of gasoline or a wet carburetor body.

The main nozzle is screwed into its passage against a gasket. The trouble may be caused by the jet loosening up and working down on the thread away from the gasket thus causing a leak at the gasket between the shoulder and the carburetor body at the top of the nozzle.

To correct, remove the adjusting screw assembly at the bottom of the carburetor and screw the jet up tightly against the gasket.

Care should be exercised not to confuse this condition of trouble with a leak that is caused by an incorrect float level adjustment. If the gasoline level in the float bowl is too high, gasoline will have a tendency to seep over the top of the main nozzle thus causing a leaky condition which may be indicated by a slow dripping of gasoline or a wet carburetor body. If the trouble is caused by the wrong gasoline level, correct by resetting the float to the correct height. (See float level adjustment under Carburetor Specifications).

Leaky Channel Plugs.—A gasoline leak which may be confused with a leaky float valve may develop on all models of Tillotson used on Durant models. The trouble is generally indicated by a slow dripping of gasoline or a wet carburetor body.

To correct this trouble, remove the carburetor air horn and tighten up the channel plugs with a screwdriver.

OIL PRESSURE

Model and Year	Min.	Max.
M-2, 4 cyl.-1928	10 lbs.	40 lbs.
D-55—1928	10 lbs.	40 lbs.
D-65—1928	10 lbs.	40 lbs.
D-75—1928	10 lbs.	40 lbs.
40—1929	10 lbs.	40 lbs.
D-60—1929	10 lbs.	40 lbs.
6-14—1930	10 lbs.	40 lbs.
6-17—1930	10 lbs.	40 lbs.
407—1930	10 lbs.	40 lbs.

IGNITION TIMING

Durant, all Models 1928-29 (semi-automatic spark advance).—To time the spark to the motor, crank the engine until No. 1 piston is approaching T.D.C. of the compression stroke and the flywheel mark D.C.-1-4 or 1-6 registers with the indicator in the flywheel housing. On models not equipped with an enclosed flywheel, the indication for piston position is the center line of the casting of No. 4 or No. 6 cylinder with the spark control in the full advance position. The distributor should be set so that the points are fully open and the rubbing block of the breaker arm is on the leading edge of the cam peak. When in this position the rotor should be under the terminal leading to No. 1 spark plug. Due to the slight variation in the action of the automatic advance mechanism, it may

Ignition Timing Table

The following table contains complete ignition timing specifications for Durant automobiles. Complete details for timing procedure will be found in this section under the car model heading.

Year	Model	Con. Pt Clear	IGNITION TIMING		Spark Lever Position	Plug Gap	Firing Order
			Fly-Wheel Travel	Dead Center Position			
1928	M-4	020″	4 teeth	B T D C.	Adv.	027″	1-3-4-2
1928	55	022″	0°	T D C	Ret	027″	1-5-3-6-2-4
1928	65	022″	0°	T D C	Ret	027″	1-5-3-6-2-4
1928	75	022″	2 Teeth	B T D C	Adv	027″	1-5-3-6-2-4
1929	Four Forty	022″	4 Teeth	B T D C	Adv.	027″	1-2-4-3
1929	60	022″	2 Teeth	B T D C.	Adv.	027″	1-5-3-6-2-4
1929	66	022″	2 Teeth	B T D C	Adv	027″	1-5-3-6-2-4
1929	70	022″	2 Teeth	B T D C	Adv	027″	1-5-3-6-2-4
1930	6-14	020″	*6°	B T D C	Adv.	027″	1-5-3-6-2-4
1930	6-17	020″	*8°	B.T D C.	Adv	025″	1-5-3-6-2-4
1930	407	020″	*6°	B T D C.	Adv.	027″	1-3-4-2

*Flywheel is marked for ignition timing

be found necessary to alter the ignition timing from that described above. On some distributors best performance is obtained when the points are set to just break contact while others require the rubbing block of the arm to be set at the peak of the cam. Road testing the car will determine the setting best suited to the motor. (See ignition timing table).

Durant, Model 6-14, 6-17 and 407 1930.—To time the spark to the motor, crank the engine until No. 1 piston is approaching T.D.C. of the compression stroke and the "IGN" mark on the flywheel registers with the indicator of the peephole in the flywheel housing with the spark control in the full advanced position. The distributor should be set so that the points just break contact with the rotor under the terminal leading to No. 1 spark plug. (See ignition timing table).

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing specifications for Durant automobiles. The correct timing procedure will be found in the paragraphs under the car model heading.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh.			
1928	M-4		008″	008″	008″	*1°A		Closes
1928	55		008″	006″	006″	*1°A		Closes
1928	65		008″	006″	006″	*1°A		Closes
1928	75		008″	006″	006″	*5°A		Closes
1929	Four 40		008″	006″	006″	*1°		Closes
1929	60		008″	006″	006″	*1°A		Closes
1929	66		008″	006″	006″	*1°A		Closes
1929	70		008″	006″	006″	*5°A		Closes
1930	614		012″	007″	008″	*5°A		Closes
1930	617		010″	007″	008″	*5°A		Closes
1930	407	012″		007″	008″	T D C	Opens	

*Flywheel marked for valve timing

Durant all Models 1928-29.—To check the valve timing set the tappet clearance of No. 1 cylinder exhaust valve at .008″. Crank the motor until No 1 exhaust valve just closes. At this point, the flywheel mark EC-1 should appear at the indicator of the peekhole in the flywheel housing. On models not equipped with an enclosed flywheel, indicator for valve timing is the center line of the last cylinder.

Durant Models 6-14 and 6-17 1930.—To check the valve timing use the procedure given above for previous models with the exception that the tappet clearance for checking timing should be set at .012″ for Model 6-14 and .010″ for Model 6-17 (see valve timing table for timing data).

Durant Model 407 1930.—To check the valve timing set the tappet clearance of the intake valve for No. 1 cylinder at .012″. Crank the motor until No. 1 intake valve just starts to open At this point, the flywheel mark indicating top dead center of pistons 1 and 4 should register with the pointer of the peekhole in the flywheel housing.

GAS LINE SCREENS

All models of Durant automobiles equipped with vacuum tank fuel feed have two strainer screens in the gasoline line. One screen is located in the top of the vacuum tank, Figs. 3 and 4, and the other at the bowl of the carburetor. Two types of vacuum tanks were used on Durant, the early

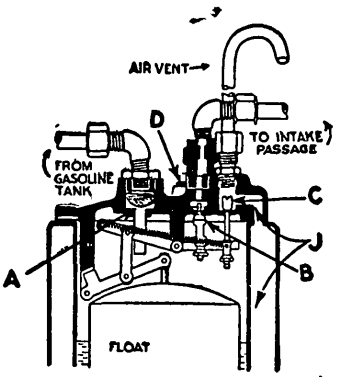


Fig. 3

Cross sectional view of upper half of Stewart vacuum tank used on Durant automobiles showing position of gas line screens. To clean, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

type shown in Fig. 3 and the later type in Fig. 4. To clean the gas line screen, remove the screen and wash in gasoline then blow clear with air. The strainer body should always be washed thoroughly before replacing the screen.

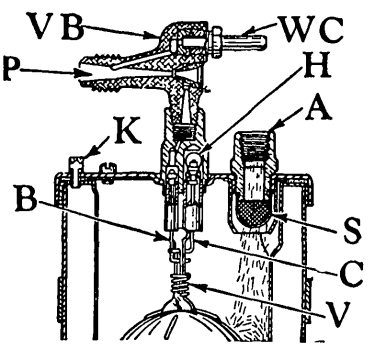


Fig. 4

Cross sectional view of late type of vacuum tank used on Durant automobiles. To clean gas line screens, remove hexagon bushing (A). The gasoline strainer should be washed in gasoline and blown clear with air.

All models of Durant equipped with fuel pump have a double strainer screen located in the top of the gasoline bowl at the fuel pump, Fig. 5, and the second screen at the carburetor. To clean the fuel pump screen, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged replace with a new one.

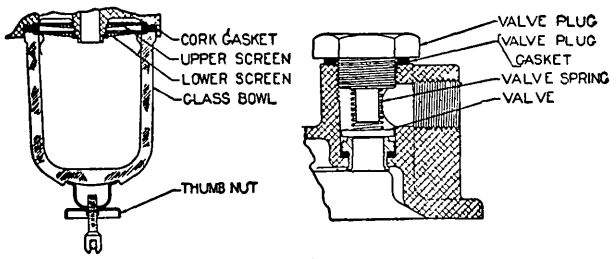


Fig. 5

Cross sectional view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when pump is replaced.

FUEL PUMP

Other than dirty gas line screens, three things should be checked on the fuel pump if trouble is experienced. First check for loose valve plugs (Fig. 5). If the valve plugs are loose the pump will fail to deliver the required amount of gasoline to the carburetor. Tighten the valve plugs securely. If necessary, replace the valve plug gasket.

If the valve plugs are tight and in good condition, next check for either a broken actuating spring or a leaky diaphragm. The diaphragm may leak either from a puncture through the diaphragm material or a leak at the edge where the diaphragm is secured to the pump body. Tighten the cover screws evenly and securely. Shellac should be applied to the edge of the diaphragm either under the diaphragm on the surface which comes in contact with the fuel pump body or on the outside of the body at the point where the diaphragm protrudes. Sometimes there appears to be a leak at the diaphragm whereas the leak actually exists at the pipe fitting and the gasoline has run down the pump body to the diaphragm flange appearing to originate there.

Just under the diaphragm in the side of the pump body will be found a small hole through the pump body wall. If gasoline leaks out through this hole, the diaphragm should be checked for a leak through the diaphragm material. If the diaphragm is found to be leaky, replace with a new diaphragm.

The pump diaphragm is actuated by a coil spring. The pump cam forces the diaphragm down and the spring as soon as the cam releases forces the diaphragm up. In service it sometimes happens that this actuating spring breaks, thus weakening the spring action against the diaphragm. If this condition exists, trouble may be experienced at high speed from lack of gasoline. To correct, replace the diaphragm actuating spring.

Carburetor Specifications

FLOAT LEVEL

Stromberg Carburetors

Stromberg U-1 and U-2 carburetors were used on the 1930 models of Durant. It has been found in service that in localities where different specific gravity fuels are used that the fuel actually affects the float level adjustment. When carburetors are shipped from the Chicago factory, they are set for fuel (petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When higher test (lower specific gravity) 68° to 70° Baumé fuel is used the float level rises and by bending the float arm the gasoline level is brought back to normal. A table of correct specific gravity for all Stromberg models together with an illustrative cut, Fig. 12A, will be found on page 70 in the Chrysler section.

Stromberg Model U-2.—The correct float level setting is 3/64″ measured from the lower surface or the gasket face of the float chamber cover to the top of the float at the center. To adjust the float level, remove the cover to which the needle valve and float assembly are attached. Hold the assembly in an inverted position and bend the float lever arm until the correct measurement is obtained.

Stromberg Model U-1.—The correct float level setting is 11/64″ measured from the lower surface or gasket face of the float chamber cover to the top of the float at the center. To adjust the float level, remove the cover to which the needle valve and float assembly are attached. Hold the assembly in an inverted position and bend the float lever arm until the correct setting is obtained.

Tillotson Carburetors

Two points should be considered when checking float level on Tillotson carburetors. One is the height of the gasoline level in the carburetor bowl and the other is the full movement of the float. In service conditions may be encountered where someone unfamiliar with the proper carburetor calibration has attempted to make a float level adjustment by bending the float lever arm. This practice generally will result in shortening the travel of the float thus shortening the travel of the float valve. If the travel of the float valve is shortened, it causes the valve to fail to open wide enough to admit sufficient gasoline to supply the motor at high speeds thus causing a condition of leanness as the result of a lack of fuel.

Tillotson 1″ Carburetors.—The float level adjustment for all 1″ Tillotson carburetors used on Durant automobiles is the same. To determine the correct float level, remove the carburetor bowl cover. The level of the gasoline in the bowl should be exactly 13/16″ below the machined top edge of the float chamber. Adjust by moving the bushing on the needle valve.

Tillotson 1¼″ Carburetors.—The float level adjustment for all 1¼″ Tillotson carburetors used on Durant automobiles is the same. The level of the gasoline in the carburetor bowl should be 15/16″ below the machined top edge of the float chamber. Adjust by moving the bushing on the needle valve.

CARBURETOR SPECIFICATION DIAGNOSIS

Carburetor Specification Information.—Two makes of carburetors, Stromberg and Tillotson, have been used as standard equipment on Durant automobiles. The jet specification information for each make of carburetor is given in the following paragraphs under the heading of the carburetor. Instructions on how to use the specifications and determine the correct carburetor calibration is also given under the carburetor heading for each carburetor.

Jet Measurement.—All jet and nozzle measurements for both makes of carburetors used on Durant are given either in wire drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch and metric drill sizes is given below.

Drill Sizes

The following table contains twist drill and steel wire gauge sizes and areas together with nearest equivalent metric sizes.

Drill No.	Dia In	Area, Sq In	Nearest Metric Size MM	Dia. In	Area Sq In	Drill No	Dia In.	Area Sq. In.	Nearest Metric Size MM	Dia In.	Area, Sq In
1	2280	04082	5 8	2298	04091	41	0960	00723	2 45	0965	00731
2	2210	03835	5 6	2205	03819	42	0935	00686	2 35	0925	00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	0866	00589
5	2055	03316	5 2	2047	03291	45	0820	00528	2 10	0827	00537
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	0807	00512
7	2010	03173	5 1	2008	03167	47	0785	00483	2 00	0787	00486
8	1990	03110	5 1	2008	03167	48	0760	00453	1 95	0768	00463
9	1960	03017	5 0	1969	03039	49	0730	00418	1 85	0728	00416
10	1935	02942	4 9	1929	02918	50	0700	00384	1 80	0709	00395
11	1910	02865	4 9	1929	02918	51	0670	00352	1 70	0669	00352
12	1890	02805	4 8	1890	02805	52	0635	00316	1 60	0630	00312
13	1850	02688	4 7	1850	02688	53	0595	00278	1 50	0591	00274
14	1820	02601	4 6	1811	02576	54	0550	00237	1 40	0551	00238
15	1800	02544	4 6	1811	02576	55	0520	00212	1 30	0512	00206
16	1770	02460	4 5	1772	02456	56	0465	00169	1 20	0472	00175
17	1730	02350	4 4	1732	02356	57	0430	00145	1 10	0433	00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	1660	02164	4 2	1654	02149	59	.0410	00132	1 05	0413	00134
20	1610	02035	4 1	1614	02046	60	0400	00125	1 00	0394	00122
21	1590	01985	4 0	1575	01948	61	0390	00119	1 00	.0394	00122
22	1570	01936	4 0	1575	01948	62	0380	00113	95	0374	00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	.00110
24	1520	01814	3 9	1535	01851	64	.0360	00101	90	0354	00098
25	1495	01755	3 8	1496	01758	65	0350	00096	90	0354	00098
26	1470	01697	3 7	1457	01667	66	0330	00085	85	0335	00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01452	3 5	1378	01491	69	0292	00067	75	0295	00068
30	1285	01298	3 3	1299	01325	70	0280	00061	70	0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0236	00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	0256	00051
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	.0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00034	55	0217	00037
36	1065	00890	2 7	1063	00887	76	.0200	00031	50	0197	00030
37	1040	00849	2 6	1024	00824	77	0180	00025	45	0177	00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00015
40	0980	00754	2 5	0984	00760	80	0135	00014	35	0138	00015

STROMBERG CARBURETORS

The jet specification information for all models of Durant equipped with Stromberg carburetors will be found under the heading of Specification Diagnosis below. Two sizes of the Stromberg Model U were used; Models 6-14 and 6-17 came equipped with Stromberg U-2 while Model 407 came equipped with U-1. The specification diagnosis information is the same for both models but the internal specifications are different.

The specification diagnosis information is given first followed by a table of carburetor specifications for each size of carburetor used.

All Stromberg carburetor specifications are given either in wire drill sizes or thousandths of an inch. The main metering jet and economizer by-pass jet sizes are given in thousandths of an inch while all other specifications are wire drill sizes except venturi tube measurements which are given in fractions of an inch.

Under the heading of Jet Measurements above a table containing twist drill and steel wire gauge sizes and areas together with nearest equivalent to metric sizes will be found.

For information as to how to read Stromberg Model numbers, see information on page 74, Chrysler section, under the heading How to Read Stromberg Model Numbers.

Specification Diagnosis

(Stromberg Model U)

Stromberg Models U-1, U-2.—The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments changed. Occasionally carburetor specifications will be changed by drilling out jet openings. This should never be done under any consideration. Take for example, idling jets or the air bleeder. In many cases, these openings are made in the carburetor body and drilling out these openings will necessitate installing a new carburetor body in order to obtain the original jet size.

When trouble is experienced with the carburetor, it should be remembered that there are seven places at which the internal adjustments may be changed to effect its operation. When attempting to determine these changes, the work should be done in order as given below.

Idling Discharge Jet (Stromberg U-1, U-2).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idling jets has drilled out the openings. In these cases, it will generally be found necessary to replace the carburetor body in order to restore the original correct opening sizes.

Diagnosis, Idle Jets too Large.—If the idling jets are too large, the motor will Roll and load regardless of how much air is admitted through the idle adjustment. Also, the motor will have a tendency to idle fast with throttle completely closed.

Main Metering Jet (Stromberg U-1, U-2).—The main metering jet or high speed adjustment (I) Fig. 6, controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be

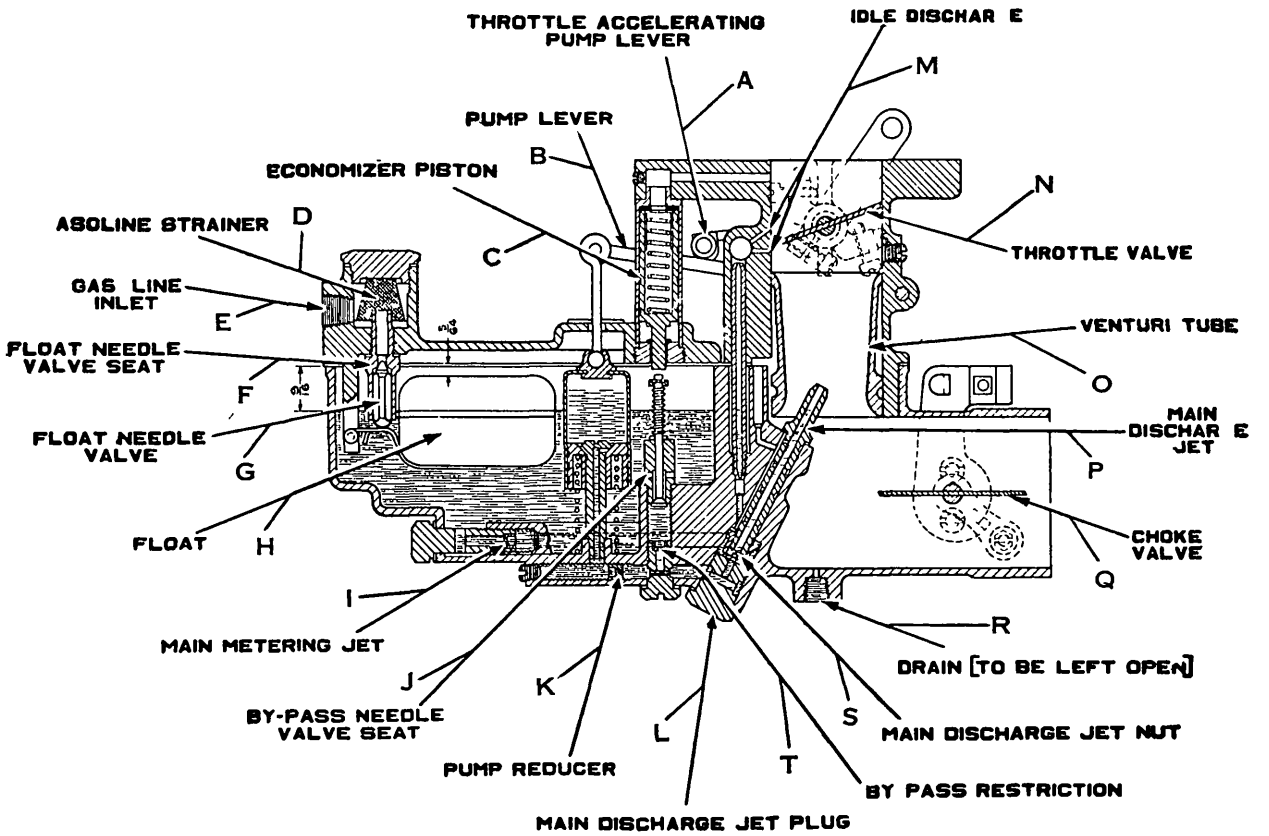


Fig. 6

Cross section view of Stromberg Model U carburetor showing vacuum economizer. As shown in the illustration, the main metering jet (I) is of the set type, however, if necessary, this jet may be changed to the adjustable type.

tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the metering jet is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Generally, when the main metering jet is too large, the car owner will complain of poor gasoline mileage at all speeds with a tendency in some cases for the motor to run rich on level road. It may also be found that when starting a cold motor the choke can be released immediately.

In localities where a hill suitable for testing is not available, the trouble can generally be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the motor will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on first test) and test the car again with wide open throttle in second gear. If reducing the metering jet size corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor accompanied in most cases with a loss of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one fourth throttle.

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of the wrong specifications. If after changing the metering jet to a larger or smaller size the trouble still exists or is exaggerated, the by-pass jet should next be checked.

By-Pass Jet (Stromberg U-1, U-2).—The by-pass jet is shown as the by-pass restriction (T) Fig. 6. The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely, the by-pass jet may be too large; the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-pass Jet too Large.—If the by-pass jet (T) Fig. 6 is too large, the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available that is steep enough for a test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle conditions When reducing the size of the by-pass jet, following instructions are recommended. If the by-pass jet in the carburetor is over .040", try

five sizes smaller. However, if the by-pass jet in the carburetor is less than .040", try two sizes smaller on first test.

Diagnosis, By-pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult. To correct this condition, replace with new by-pass valve.

Diagnosis, By-pass Jet too Small.—If by-pass jet is too small, the car owner may complain of lack of power at speeds and on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up. A tendency to poor acceleration will prevail under all conditions.

If the trouble symptoms indicate a small by-pass jet try a jet one or two sizes larger.

Main Discharge Jet (Stromberg U-1, U-2).—It is seldom in actual practice that a large main discharge jet (P) Fig. 6 will have any affect on carburetor performance other than to lower the gasoline mileage. This condition holds true, however, within certain limits. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. Care should be exercised not to confuse the symptoms caused by a large main discharge jet with those produced by a large by-pass jet. If the trouble is actually caused by a large main discharge jet, reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and Roll at high speeds, the trouble will probably be caused by a main discharge jet that is too large. Care should also be exercised not to confuse the trouble caused by a large main discharge jet with a venturi that is too small. (See information below for small venturi).

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet (P) Fig. 6 is too small, the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull (see paragraph above).

High Speed Air Bleeder (Stromberg U-1, U-2).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore any changes of the air bleed should be avoided. In the back of the book will be found more complete information explaining the purpose of the high speed air bleeder (see index in the front of the book).

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on. The car owner may complain of a tendency for the motor to hesitate on slow acceleration and in some cases the motor may die in traffic.

It should be remembered that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, turn to the specification table which contains the correct drill size specifications for the particular carburetor model in question. These carburetor specifications will be found in the table at the end of each specification diagnosis section for the particular carburetor model in question. After the correct air bleed wire drill size is known, see whether someone unfamiliar with the correct carburetor calibration procedure has drilled out the air bleed opening. If the air bleed opening has been drilled out, it may be necessary in order to correct the trouble, to replace the carburetor body. However, if the air bleeder is of the changeable type, a smaller air bleeder may be used.

In most cases an air bleeder that is too large can be checked out on level road test by slowly accelerating the car to approximately 25 miles per hour with the spark half retarded. If the air bleed opening is too large, from one to three flat spots will probably be experienced and in some cases accompanied by a popping back of the motor during the period of slow acceleration.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds. The car owner may complain of low gasoline mileage at all car speeds accompanied by a tendency in extreme cases for the motor to Roll and load at low speeds and on acceleration. On a level road test with wide open throttle, the car will lack speed and power.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass that is too large.

If a hill suitable for test purposes is not available the trouble can generally be checked out by level road test in the following way.

First replace the air bleeder with a larger size (not to exceed four sizes larger on the first test). It should be remembered, however, that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passageway is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved when a larger opening is used but if no change is noticed or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Accelerating Pump (Stromberg U-1, U-2).—The pump reducer (K) Fig. 6 regulates the flow of gasoline from the accelerating pump and affects the operation of the carburetor during quick ac-

celeration On Model U carburetors with manual controlled by-pass or economizer valve make sure that the roller of the throttle accelerating pump lever is in contact with the pump lever arm when the throttle is in closed position

Diagnosis, Pump Discharge Jet too Large or too Small—If the pump discharge jet is too large the motor will stumble on quick acceleration If the jet is too small, the motor will usually backfire on quick acceleration The trouble may be corrected by either increasing or reducing the size of the discharge jet as indicated by the symptoms of the trouble

Venturi Tubes (Stromberg U-1, U-2)—Two types of venturi tube design are used in Stromberg Model U carburetors In one type the venturi is cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed In practice it is seldom that trouble from a venturi tube of wrong size is experienced On the interchangeable type, the venturi is locked into place by a set screw that may work loose Before testing for wrong venturi size, see that the set screw is tight

Diagnosis, Venturi too Large—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet As the car gains momentum on acceleration, the motor performance will improve until at high speeds the carburetor operation may be fairly satisfactory with good gasoline mileage

Diagnosis, Venturi too Small—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to Roll and load On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor

TILLOTSON CARBURETORS

Important Information.—The jet specification information for all models of Durant equipped with Tillotson carburetors is arranged by carburetor model rather than by car model To find the jet specification information for any particular model of Durant determine the model of carburetor by either referring to the table of motor specifications under Carburetor Adjustment or by examining the name plate of the carburetor

All Tillotson specifications except venturi sizes are given in wire drill sizes in the table of Drill Specifications Venturi sizes are given in fractions of an inch

In every case where trouble is experienced in obtaining a correct carburetor adjustment and all other units such as ignition, spark plugs, etc , have been accurately checked, the carburetor should be first removed and thoroughly cleaned

Tillotson Model R-4A and R-6A Carburetors.—In service mechanics who do not understand these carburetors attempt to improve the performance by drilling out the nozzle holes This should never be done under any consideration The adjusting needle is for the purpose of varying the gasoline mixture and takes care of the carburetor through its complete range of adjustment

To enable the mechanic to determine whether or not the internal carburetor specifications have been changed, complete wire drill specifications for all Model R carburetors used on Durant are given in the following tables When checking drill specifications, extreme care should be exercised not to damage the openings in any way

Drill Specifications

(Tillotson Model R 4A)

Description of Part	Number of holes	Drill Size
Venturi Upper 13/16"		
Venturi Lower 5/16"		
Main Nozzle (Upper Holes)	2	No 42
Main Nozzle (Middle Holes)	2	No 48
Main Nozzle (Lower Holes)	1	No 65
By-Pass Upper Supply Hole (in body casting)	1	No 70
By Pass Lower Supply Hole (in body casting)	1	No 56
By Pass Air Adjusting Hole	1	3/32"
By-Pass Air Bleed Hole	1	No 60
By-Pass Fuel Restriction Hole	1	No 74
Fuel Adjusting Hole	1	No 55
Inner Well Air Bleed Hole	1	No 36
Outer Well Air Bleed Hole	1	5/32"

Drill Specifications

(Tillotson R 6A)

Description of Part	Number of holes	Drill Size
Venturi Upper 27/32"		
Venturi Lower 5/16"		
Main Nozzle (Upper Holes)	2	No 52
Main Nozzle (Middle Holes)	2	No 52
Main Nozzle (Lower Holes)	2	No 65
By-Pass Upper Supply Hole (in body casting)	1	No 70
By Pass Lower Supply Hole (in body casting)	1	No 58
By Pass Air Adjusting Hole	1	3/32"
By Pass Air Bleed Hole	1	No 60
By-Pass Fuel Restriction Hole	1	No 74
Fuel Adjusting Hole	1	No 60
Inner Well Air Bleed Hole	1	No 36
Outer Well Air Bleed Hole	1	No 50

Tillotson Model SP-13A and SP-13B Carburetors.—If trouble is experienced in obtaining a correct carburetor adjustment, the carburetor should be removed from the car and all jets and passageways thoroughly cleaned, to see that no dirt has lodged in the openings If this does not correct the trouble, it may be that someone has tampered with the carburetor In service, mechanics who do not understand these carburetors attempt to improve the performance by drilling the nozzle holes This should never be done under any consideration The adjusting needle is for the purpose of varying the gasoline mixture and takes care of the carburetor through its complete range of adjustment

In order to enable the mechanic to determine whether or not the internal carburetor specifications have been changed, complete wire drill specifications for the SP models of Tillotson used on Durant are given in the following tables Extreme care should be exercised when checking drill and nozzle openings not to damage the openings by carelessly inserting the drill

Drill Specifications
(Tillotson Model SP-13A)

Description of Part	Number of holes	Drill Size
Venturi Upper 29/32"		
Venturi Lower 5/16"		
Main Nozzle (Upper Holes)	2	No 60
Main Nozzle (Middle Holes)	2	No 65
Main Nozzle (Lower Holes)	2	No 60
By-Pass Upper Supply Hole (in body casting)	1	No 70
By-Pass Lower Supply Hole (in body casting)	1	No 58
By-Pass Air Adjusting Hole	1	3/32"
By-Pass Air Bleed Hole	1	No 60
By-Pass Fuel Restriction Hole	1	No 74
Fuel Adjusting Hole	1	No 56
Inner Well Air Bleed Hole	1	No 36
Outer Well Air Bleed Hole	1	No 52

Drill Specifications
(Tillotson Model SP-13B)

Description of Part	Number of holes	Drill Size
Venturi Upper 29/32"		
Venturi Lower 5/16"		
Main Nozzle (Upper Holes)	2	No 60
Main Nozzle (Middle Holes)	2	No 65
Main Nozzle (Lower Holes)	2	No 60
By-Pass Upper Supply Hole (in body casting)	1	No 70
By-Pass Lower Supply Hole (in body casting)	1	No 58
By-Pass Air Adjusting Hole	1	3/32"
By-Pass Air Bleed Hole	1	No 60
By-Pass Fuel Restriction Hole	1	No 70
Fuel Adjusting Hole	1	No 56
Inner Well Air Bleed Hole	1	No 36
Outer Well Air Bleed Hole	1	No 52

Tillotson Model V-1A Carburetor.—Tillotson Model V carburetors are similar to the SP type with the exception of the high speed adjustment

Mechanics who do not understand Tillotson carburetors attempt to improve the performance by drilling out nozzle holes This should never be done under any consideration The adjusting needle is for the purpose of varying the gasoline mixture and takes care of the carburetor through with the exception of the high speed adjustment

To enable the mechanic to determine whether or not the internal carburetor specifications have been changed, complete wire drill specifications for Tillotson Model V carburetors used on Durant are given in the following tables

Tillotson V-1A
(Drill Specifications)

Description of Part	Number of holes	Drill Size
Venturi Large 1 5/32"		
Venturi Small 7/16"		
Nozzle (Upper Holes)	2	No 60
Nozzle (Middle Holes)	2	No 60
Nozzle (Lower Holes)	2	No 58
By-Pass Upper Supply Holes (in body casting)	1	No 70
By-Pass Lower Supply Holes (in body casting)	2	No 58
By-Pass Air Adjusting Hole		No 60
By-Pass Air Bleed Hole		No 60
By-Pass Fuel Restriction Hole		No 70
Fuel Adjusting Hole		No 52
Inner Well Air Bleed Hole		No 36
External Well Air Bleed Hole		No 35
Pump Delivery Nozzle		No 55
Internal Air Bleed Hole		No 50

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor

Car and Year	Model	Engine	No Cyl	Bore and Stroke	Carb Model and Size
DURANT					STROMBERG
1930	6-14	Cont 22A	6	3 1/4"x4"	U-2
1930	6-17	Cont 15U	6	3 3/8"x4 5/8"	U-2
1930	407	Cont W-8		3 7/8"x4 1/4"	U-1
					TILLOTSON
1928	M-4	Cont	4	3 3/8"x4 1/4"	R 6A-1"
1928	55	Cont 14L	6	2 3/4"x4 3/4"	R 4A-1"
1928	65	Cont 15L	6	2 7/8"x4 3/4"	SP-13A SP-13B R4A 1"
1928	75	Cont 15U	6	3 3/8"x4 5/8"	V-1A-1 1/4"
1929	Four Forty	Cont W-5	4	3 3/8"x4 1/4"	R-6A-1"
1929	60	Cont 14L	6	2 7/8"x4 3/4"	R-4A-1"
1929	66	Cont 14L	6	2 7/8"x4 3/4"	R-4A-1"
1929	70	Cont	6	3 3/8"x4 5/8"	R-4A-1 1/4"

ADJUSTMENT PRECAUTIONS

Sleeve Economizer.—It is important on all Tillotson type carburetors equipped with sleeve type economizer to see that the economizer is properly adjusted If the economizer valve is open at low speeds, motor performance will be affected in that it will be difficult to obtain a smooth idle or low speed adjustment As shown in Fig 7, the economizer should be adjusted with a 1/64" to a 1/32" overlap in the closed position when the carburetor throttle valve is completely closed This adjustment can be obtained by loosening the set screw (A) and moving the control arm on the end of the economizer shaft

If difficulty is experienced in obtaining an adjustment or if car performance does not seem to be correct after a proper adjustment of the economizer has been made, check to see that the economizer sleeve is not worn excessively Also check to see that the throttle shaft is not badly worn If the throttle shaft or economizer sleeve is worn to the point of where car performance is affected, replace with new part

Manifold Effect on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed for each movement of the adjusting screw at the bottom of the carburetor This is necessary to

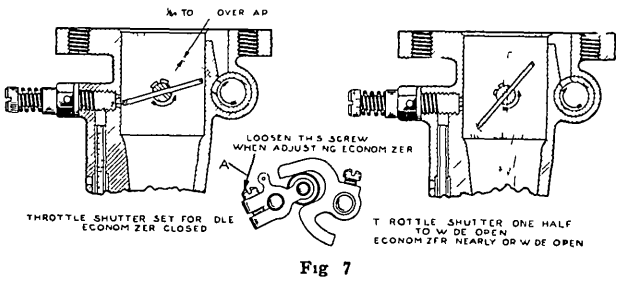

A TO OVER AP
LOOSEN THIS SCREW WHEN ADJUSTING ECONOMIZER
THROTTLE SHUTTER SET FOR IDLE ECONOMIZER CLOSED
THROTTLE SHUTTER ONE HALF TO WIDE OPEN ECONOMIZER NEARLY OR WIDE OPEN

Fig 7

Cross sectional view of upper half of carburetor throat showing location and adjustment of sleeve type economizer used on Tillotson carburetors The adjustment of the economizer is accomplished by means of the adjusting screw (A) It is important that the economizer be adjusted so that there is from 1/64" to 1/32" overlap when the throttle valve is closed as shown in the left hand view

allow time for the fuel that has accumulated in the manifold to pass into the motor. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. This is especially true of the idle and high speed adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment, there is a wide range between the point where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation, adds nothing to the performance of the car and lowers the gasoline mileage.

TILLOTSON MODEL R

In order to obtain an accurate and correct adjustment of a Tillotson carburetor, all other units on the engine such as ignition points, spark plug points, motor compression, etc., should be in good condition. See that all special instructions given in the section following the Motor Tune-Up have been checked. Also refer to Adjustment Precautions above for special information regarding carburetor adjustment.

The Tillotson Model R carburetor used on Durant automobiles is of the non air valve type having two adjustments, namely, the by-pass adjustment for idle and low speeds and the needle adjusting screw for medium and high speeds, see Fig. 8. The idle nozzle gets its fuel from the main nozzle, therefore, the main nozzle should be adjusted first.

High Speed Adjustment.—To adjust the carburetor after it has been completely overhauled and replaced on car, proceed as follows: Close the main adjusting screw (A) Fig. 8 to its seat (do not force against seat) then open two or three turns to the left or down. Close the by-pass or idle adjustment screw (B) to its seat. Then open to the left or out one turn. Start the motor and set the throttle on the steering column about one third open or to a position where the motor will be running at approximately 30 miles per hour car speed and keep the throttle in this position until the adjustment is completed.

After the motor is thoroughly warmed up, retard the spark lever fully and with the motor running at the same speed, turn the high speed adjustment (A) slowly to the right or up until the engine

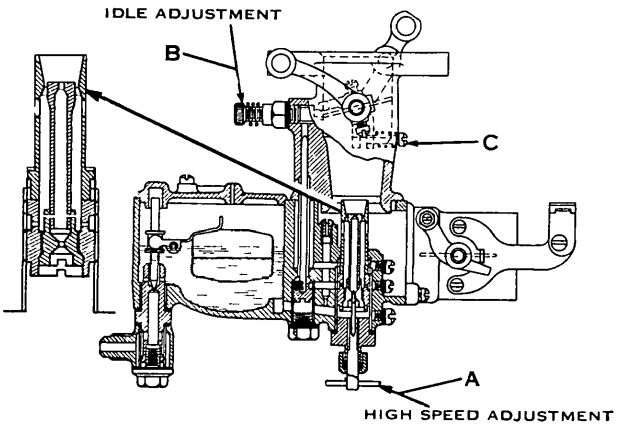


Fig 8

Cross sectional view of Tillotson Model R carburetor used on Durant automobiles showing an enlarged section of the main discharge nozzle assembly.

slows down for want of fuel. At this point, turn very slowly in the reverse direction (usually from one fourth to three eighths of a turn) to that point where motor runs at maximum speed. Do not open the high speed adjustment beyond the point of where the motor smooths out and runs at maximum speed since the most economical motor performance will be obtained with the needle valve in this position.

Low Speed Adjustment.—Close the throttle and make sure that the throttle stop screw does not allow the throttle to become fully closed. Then to get the proper idling mixture, turn the adjustment thumb screw (B) Fig. 8 to the left or anti-clockwise admitting more air and making the mixture leaner. Continue to turn until motor sputters or misses. At this point, turn slowly in the reverse direction to that position where the engine again fires evenly. After the idling mixture is correct, which should be approximately one full turn from a fully seated position, adjust the throttle stop screw to the proper idling speed of the motor.

TILLOTSON MODEL SP

Important.—Before changing the carburetor adjustment, make sure that the trouble does not lie elsewhere. Examine the spark plugs and breaker points to see that they are correctly set and that the choke is in full open position; also refer to the tune-up precautions immediately following the Tune-Up Operations and check all items that would affect the carburetor performance. Read the adjustment precautions given above.

High Speed Adjustment.—Close the main adjusting needle (D) Fig. 9 by turning to the right or up until the needle is seated (never force tightly against its seat). Then open by turning to the left or down two complete turns. Close the by-pass or idle adjustment (E) until it is seated by turning to the right or in, then open by turning to the left or out one half turn. Thus adjusted, the engine should start and operate.

With the throttle partly open to an engine speed of approximately 25 miles per hour, allow the motor to warm up to normal driving temperature. After the motor has warmed up, retard the spark control lever fully and gradually turn the main adjusting needle to the right or up to a point where the engine slows down for want of fuel. When this point is reached, stop and gradually turn in the reverse direction until that position is found where the engine runs smoothly. This adjustment should be carefully made for gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and run smoothly. Provision for maximum power is automatically supplied so that care should be exercised in adjusting the main adjustment needle (D) to provide for economical road performance. After the high speed adjustment is complete, next adjust the idling screw (E).

Idle Adjustment.—Turning the idle adjusting screw (E) Fig. 9 to the right (clockwise) gives a richer mixture; turning it to the left (anti-clockwise) gives a leaner mixture. This adjustment is sensitive and should be made with care.

Close the throttle fully and with the spark still retarded, set the throttle lever stop screw to run the engine at slightly faster speed than is desired for normal idling conditions. Turn the low speed adjusting needle (E) gradually to the left or out until a noticeable flutter or missing occurs. At this point turn the screw in the reverse direction to that position where the engine again fires evenly. Leave the adjustment at this position, that is, delivering just as thin a mixture as will properly idle the engine. Next, carefully adjust the throttle lever stop screw to operate the engine at the desired idling speed.

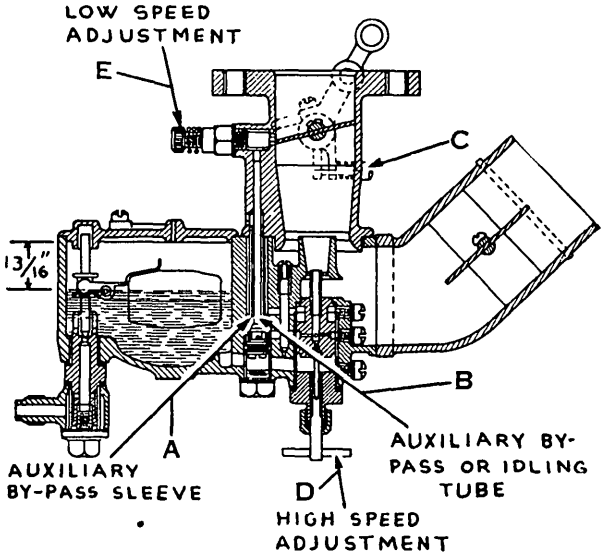


Fig. 9

Cross section view of Tillotson Model SP carburetor used on Durant automobiles. The auxiliary by-pass tube (A) must not be cracked or leaky. See Fig. 1 for method of flaring.

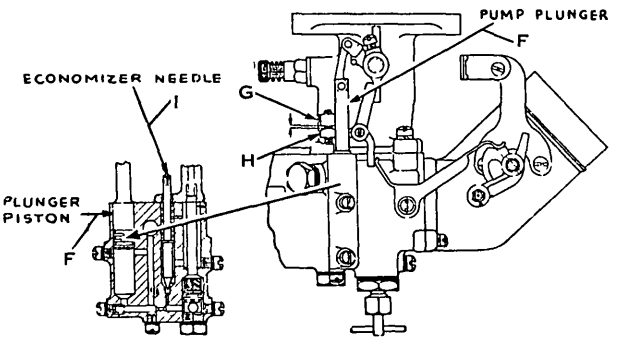


Fig. 10

Sectional view with insert of Tillotson Model SP type of carburetor used on Durant automobiles showing the accelerating pump (F) and economizer needle (I). The normal lift of the economizer needle is 1/16". This device enriches the mixture for starting and operating a cold engine It also provides a richer mixture for power purposes. (See adjustment instructions under Dash Control).

Accelerating Pump.—Sudden enrichment of the mixture is necessary to quick engine acceleration, and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is suddenly opened, the piston of the accelerating pump is raised lifting fuel into the upper chamber. (See Fig. 10). This small amount of fuel flows through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportion for maximum power.

While driving at normal speed with the throttle partly open, the mixture is regulated for maximum economy. When the throttle is opened wide, the carburetor delivers the proper mixture for maximum power.

Dash Control or Auxiliary Lift Needle.—In starting a cold engine the carburetor dash control should be pulled out all the way and as soon as the engine starts the control should be moved slightly inward. This automatically supplies a rich mixture to the engine, thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control since this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that the choke lever is as far back as it will go with the control fully seated.

If it should become necessary to reset the lift or metering pin, proceed as follows: With the throttle closed and the choke fully opened, there should be a minimum of .030" to .040" play between the adjustable nut (G) Fig. 10 and the fork (H) of the cross lever. There should always be sufficient play between the lever coupling, the choke cam and the needle lift lever to insure a seating of the needle.

As shown in Fig. 10 the metering or economizer needle (I) also provides a richer mixture for power purposes at high speeds with the throttle opened. Thus, it is important that the economizer

needle adjustment be accurately made as described above.

TILLOTSON MODEL V

The Model V Tillotson is a plain tube expanding type of carburetor having fixed air passages while the fuel is automatically controlled in proportion. The carburetor is designed to give maximum power and economy with ordinary fuel. Before changing the carburetor adjustment, make sure that the trouble does not lie elsewhere. Check the spark plugs and breaker points to see that they are correctly set and that the choke is in the full open position.

High Speed Adjustment.—If the carburetor has been dismantled for any purpose, adjust as follows: Close the high speed adjusting needle (A) Fig. 11 by turning to the right or down until the needle is seated (never force tightly against its seat). Then open by turning to the left or up three complete turns. Next close the by-pass or idling adjustment (B) until it is seated by turning to the right or in, then open by turning to the left or out three-quarters to one full turn. Thus adjusted, the engine should start and operate.

Retard the spark control lever fully. With the engine running approximately 25 miles per hour car speed, gradually turn the main adjusting needle (A) to the right or up to a point where the engine slows down for want of fuel. When this point is reached, stop and gradually turn in the reverse direction until that position is found where the engine runs free. This adjustment should be carefully made for gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and smooth running. Provision for maximum power is automatically supplied through the accelerating pump and the needle lift, so in adjusting, set the main adjustment to provide for economical road performance.

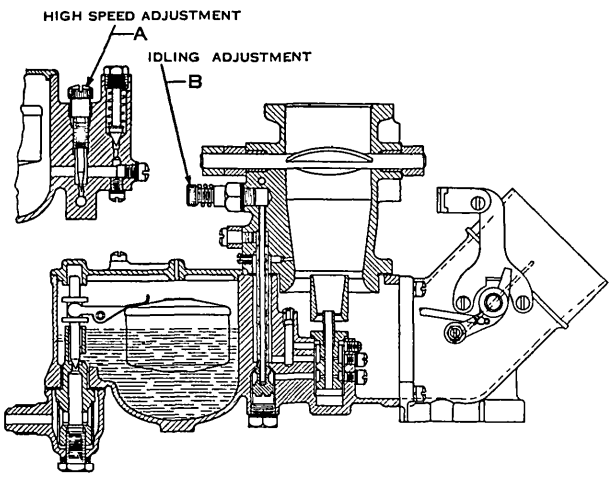


Fig. 11

Cross section view of Tillotson Model V carburetor used on Durant automobiles showing a cross section view of the high speed adjustment (A). Model V carburetors are different from the SP type in that the high speed adjustment is mounted behind the bowl as shown while on the SP type the high speed adjustment is located at the bottom of the carburetor.

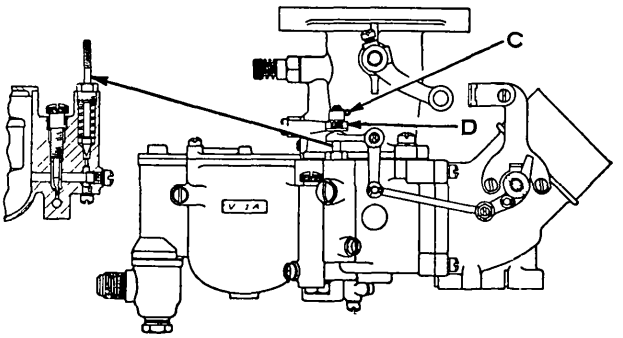


Fig. 12

View of Tillotson Model V carburetor used on Durant automobiles showing a sectional view of the high speed adjustment and auxiliary starting needle. The lift of the auxiliary needle can be regulated by the nut (D).

Idle Adjustment.—Close the throttle and with the spark control lever retarded, set the throttle lever stop screw to run the engine faster than is desired for normal idling speed. Next turn the idle adjustment (B) gradually to the left or out thinning the mixture until a noticeable flutter or missing occurs. At this point, turn the screw in the reverse direction only to that position where the engine again runs smoothly. Leave the adjustment at this position delivering just as thin a mixture as will properly idle the engine and carefully adjust the throttle lever stop screw to operate the engine at the desired idling speed.

In operation, the carburetor is fully automatic except that at partial choke position as controlled through the manual choke control on the dash, fuel metering is governed by the usual high and low adjustment needles.

Lift or Metering Needle Setting.—The metering or economizer needle is affected by the dash control when starting and by the throttle lever at high speeds. In starting a cold engine, the carburetor dash control should be pulled out all the way and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine, thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control as this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. If it should become necessary to adjust the dash control to the carburetor see that the choke lever is as far back as it will go with the controls fully seated.

If it should become necessary to reset the lift needle, proceed as follows: With the throttle closed and the choke fully opened, there should be a minimum of .030″ to .040″ play between the adjustable nut (C) Fig. 12 on the needle and the fork (D) on the cross lever. There should always be sufficient play between the levers coupling the choke cam and the needle cam lift lever to insure the seating of this needle.

Essex 1925-30

Motor Tune-Up

When tuning the motor, the carburetor is the last unit that should be checked. With present day motors and fuels, there are many symptoms of trouble caused by improper timing, compression and valve adjustment which resembles closely, carburetor trouble. On Essex motors care should be exercised not to confuse symptoms caused by improper ignition timing, distributor and spark plug adjustments with carburetor trouble. However, if the trouble is finally traced to the carburetor, the carburetor should be removed and thoroughly cleaned before making any changes.

If difficulty is experienced when tuning up an Essex motor, refer to the special information following the tune-up operations.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: When adjusting the timing chain, special care should be exercised not to damage the gasket between the eccentric assembly and the engine case. If this gasket is damaged an oil leak will occur. (See Timing Chain adjustment).
3. Check the ignition timing; adjust if necessary.
4. Adjust the valve tappets and free up valves.
5. Clean gas line strainers and screens. Also check gas lines for loose fittings.
6. Check fan belt; adjust if necessary.
7. Adjust carburetor; clean if necessary.
   Note: If difficulty is experienced in obtaining a correct carburetor adjustment on either Marvel or Stewart equipment, check to see that the air valve is working properly. On Marvel carburetors, faulty air valve action will generally be found to be the result of a weak air valve spring. On Stewart carburetors, faulty air valve action is generally caused by sticking of the dash pot piston which controls the action of the air valve or aspirating valve assembly.
8. Road test car.
   Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Ignition Timing and Distributor Points.—Of all the motor tune-up operations for Essex, the most critical is ignition timing, spark plug and contact point settings. If the points are not properly cleaned and adjusted, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds.

Carburetor Air Valve (Stewart Carburetors).—A lean mixture that will prevent a correct idling adjustment may be caused by dirt or grit between the dash pot piston and cylinder wall thus causing the air valve to stick in the open position. If the trouble is not exaggerated enough to cause the valve to stick open but just retards its free action trouble will probably be experienced at all motor speeds. The air valve sticking open may also cause a condition of hard starting.

To determine whether the air valve is stuck in the open position, pull out carburetor choke and crank the motor. If a pronounced sucking noise is heard, the air valve is not stuck open. However, if a sucking noise is not heard the air valve will be found to be in the open position. If the air valve is stuck in the open position, a few sharp raps on the carburetor body will generally cause it to settle into position.

To correct a condition of a sticking air valve, remove the carburetor from the car and clean thoroughly. Polish the valve with any good grade of metal polish. Do not use sandpaper or any rough abrasive under any consideration.

Bent Carburetor Metering Pin (Stewart Carburetors).—A bent carburetor metering pin may cause the air valve to stick and result in a poor idling condition. This trouble is usually the result of careless handling in assembling or dismantling the carburetor.

To correct, replace the bent metering pin with a new one.

Pinion Gland Shaft too Tight (Stewart Carburetor).—A poor idling condition may be the result of a rich mixture caused by a pinion gland that is too tight on the pinion shaft, Fig. 4, at the bottom of the carburetor. The pinion shaft is attached rigidly to the pinion which in turn is in contact with the rack and raises and lowers the metering pin. At the outer end of the pinion shaft an arm is attached, against which the adjusting screw operates. In order to prevent a leak around the pinion shaft a packing gland is used. Care should be exercised when adjusting the gland nut to see that the nut is not tightened sufficiently to cause the shaft to bind and thus prevent the hand regulated bell crank from coming to rest against the adjusting screw when the dash control button is pushed in. To correct this condition, loosen the gland.

Carburetor Dash Control Wire too Short (Stewart Carburetors).—A poor idling condition may be the result of a rich mixture caused by a dash control wire that is too short. Make sure that the control wire is long enough to force the hand regulated bell crank attached to the pinion shaft at the bottom of the carburetor, firmly against the adjusting screw when the control button on the dash is pushed in all the way.

Air Valve Piston Sticking (Marvel Carburetors).—A condition of poor idle may be caused by the air valve piston sticking on cars equipped with Marvel carburetors. This air valve piston is located

directly under the air valve adjusting screw and operates against the air valve spring. The trouble is generally indicated by the fact that it is difficult to obtain a correct adjustment, also movement of the air valve adjusting screw does not have the proper effect on the air valve action.

To correct, dismantle the carburetor and recondition the air valve piston cylinder by the use of a special reamer. The clearance between the piston and cylinder wall should not exceed .006". (See Specification Diagnosis Section).

Spark Plug Gap Clearance.—On early models of Essex cars equipped with low compression cylinder heads a poor idling condition may be caused by setting the spark plug points too close together. On these early models, a setting of not less than .027" nor more than .030" is recommended.

On late model Essex cars, the spark plug gap setting should be not less than .022".

Air Leaks.—A poor idling condition on cars equipped with Marvel carburetors may be caused by loose manifold nuts due to the influence of heat. This condition can be checked out by means of a squirt can full of gasoline. If motor performance is affected when gasoline is squirted over the manifold gasket, the manifold nuts will probably be found to be loose and should be tightened. If tightening does not relieve the trouble, replace the gasket.

Carburetor.—When tuning up the motor, the carburetor is the last unit that should be checked. Do not, under any consideration, change or tamper with the carburetor until after the ignition, valve timing and motor compression have been checked. Follow closely all recommendations relative to timing given in the paragraphs above. If the trouble is finally traced to the carburetor, first make certain that the carburetor has been properly adjusted (see carburetor adjustment instructions in Carburetor Adjustment section).

If the trouble still persists, remove and thoroughly clean all jets and passages. If cleaning and correctly adjusting the carburetor does not eliminate the trouble, a poor idling condition may be caused by someone tampering with the idling openings. Turn to Idle Jets in Carburetor Specification Diagnosis.

Poor Acceleration

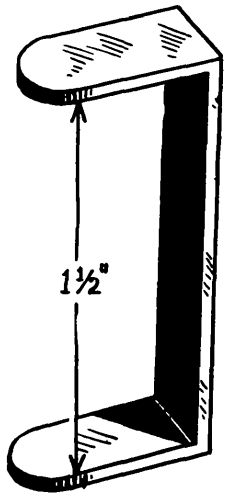
Air Valve Failure (Marvel and Stewart Carburetors).—A decided flat spot on acceleration may be caused by a weak air valve spring. The trouble is generally indicated by the fact that the air valve screw must be screwed in an excessive amount. To correct this trouble, replace the air valve spring.

A gauge is supplied as illustrated in Fig. 1 for the purpose of measuring the length of Marvel carburetor air valve spring. Air valve spring action is only correct when the spring has the proper temper tension and length. Never stretch the air valve spring if it is too short. Always replace with a new spring. The correct length is 1½".

A decided flat spot on acceleration on cars equipped with Stewart carburetors may be caused by failure of the ball valve in the piston head at the bottom of the aspirating valve assembly. This trouble is generally caused by damage to the ball valve seat as the result of someone unfamiliar with Stewart carburetor repair procedure inserting a Spanner wrench in the ball valve seat.

Fig 1

As shown in the figure, an air valve spring measuring gauge can be formed from a piece of sheet metal for Marvel air valve springs. Two types of springs have been used, one has a number of closed coils at the center and is zinc plated The other type does not have closed coils at the center, but all coils are wound equally spaced The type of spring having closed coils at the center should have a free length of 1½" while the other type should have a free length of 1 1/16". Air valve springs for Marvel carburetors should never be stretched under any consideration. The spring is balanced to exert a certain tension at the different range positions of the air valve and distorting the spring in any manner whatsoever will upset this balance and make the correct operation of the carburetor impossible



Accelerating Pump.—A condition of poor acceleration on Essex cars equipped with Marvel carburetors may be caused by the accelerating pump sticking or by the connecting link pin that connects the actuating arm with the pump plunger rod working out. When this pin is lost there is no action of the accelerating pump when the throttle valve is suddenly opened.

To correct a condition of accelerating pump failure due to the plunger sticking, dismantle the carburetor and clean thoroughly.

Lack of Power

Ignition and Valve Timing.—A lack of power may be caused by improper ignition timing and pitted or incorrectly adjusted contact points. The contact points should be removed, thoroughly cleaned and squared up.

Lack of power may also be caused from incorrect valve timing due to a loose timing chain jumping a sprocket tooth. To correct, retime the motor and check the timing chain adjustment.

Carburetor.—When tuning a motor the carburetor is the last unit that should be checked. Do not, under any consideration, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. Follow closely, all tun-up recommendations in the paragraphs above.

If the trouble is finally traced to carburetor, first make certain that the carburetor has been properly adjusted (see carburetor adjustment instructions in the Carburetor Adjustment section).

If the trouble still persists, after the carburetor has been correctly adjusted, remove and thoroughly clean all jets and passages

Lack of power may be caused by faulty carburetor air valve action See information above for carburetor air valve, bent carburetor metering pin, pinion shaft gland too tight, etc , under the heading of Poor Acceleration

Motor Cuts Out on Pull

Spark Plug Gap Clearance.—Misfiring or cutting out of the motor on a pull may be caused by a too wide spark plug gap setting on the late models or motors equipped with high compression heads. This trouble can be eliminated by reducing the spark plug gap clearance to .022".

On Essex 1927 models or cars equipped with low compression cylinder heads, a rough running condition may be caused by a spark plug point setting that is too close On these early models, a setting of not less than 027" nor more than .030" is recommended.

OIL PRESSURE

Model and Year	Min	Max
Six 1925	1 lb	5 lbs.
Six 1926	1 lb.	5 lbs
Six 1927	1 lb	5 lbs
Six 1928	1 lb	5 lbs.
Super Six 1929	1 lb	5 lbs.
Super Six 1930	1 lb	5 lbs

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing specifications for Essex 1925-30 Spark control on all models of Essex from 1925 to 1930 is automatic.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
1925	Six	020"	T D C	Autom	028"	1-5-3-6-2-4
1926	Six	020"	T D C	Autom	028"	1-5-3-6-2-4
1927	Six	020"	T D C	Autom	028"	1-5-3-6-2-4
1928	Six	020"	T D C	Autom	028"	1-5-3-6-2-4
1929	Super Six	018" 020"	T D C	Autom	028"	1-5-3-6-2-4
1930	Super Six	018" 020"	T D C	Autom	022" 023"	1-5-3-6-2-4

Autom —Automatic spark advance T D C —Top dead center

Essex Six all Models 1925-30.—The contact points should just start to break when Piston No. 1 entering compression stroke, is at top dead center and the flywheel mark indicating top dead center for piston No. 1 and No. 6 registers with the lower edge of the peephole in the flywheel housing. The distributor is of the full automatic advance type with no manual control.

Motors using Ethyl or treated gasoline should be timed so that the spark occurs 7/8" before top dead center of the compression stroke. (See Ignition Timing Table for contact point clearance and ignition data).

VALVE TIMING

Valve Timing Table

The following table contains valve timing specifications for Essex 1925-30 All valve tappet adjustments are for hot settings unless otherwise indicated

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int	Exh.			
1925	Six		007"	005"	007"	*8°A		Closes
1926	Six		007"	005"	007"	*8°A		Closes
1927	Six		007"	005"	007"	*8°A		Closes
1928	Six		007"	005"	007"	*8°A		Closes
1929	Super Six		007"	005"	007"	*8°A		Closes
1930	Super Six		007"	005"	007"	*8°A		Closes

A —After top dead center
* Eight degrees of flywheel travel is approximately three flywheel teeth on the rim of the flywheel

Essex all Models 1925-30.—To check the valve timing set the tappet clearance for No 1 exhaust valve at 007". Crank the motor until No. 1 exhaust valve just closes. At this point, the flywheel mark indicating top dead center of pistons 1 and 6 should be approximately three flywheel teeth past the indicator of the peekhole in the flywheel housing. Unless otherwise designated, the indicator is the lower edge of the square peekhole in the flywheel housing.

CHAIN ADJUSTMENT

Essex Six all Models 1925-30.—Slack in the timing chain is removed by means of an eccentric adjustment built into the distributor drive gear housing. To adjust the timing chain, loosen the three bolts that secure the distributor drive gear housing to the timing case and turn the notched adjusting nut so that the top moves away from the motor. When the chain is properly adjusted, there should be 1/8" movement of the generator drive coupling when rotated with the fingers.

A point may be reached in the adjustment of the timing chain at which the inside top and lower support bolts will interfere with the movement of the adjusting nut. When this happens, remove the bolts, make the adjustment and allow the bolt to pass through a notch in the adjusting nut. Care should be exercised not to damage the gasket between the eccentric housing and the timing chain case. To avoid damaging the gasket, the housing flange should be forced away from the housing just far enough to clear the gasket before adjustment is made.

GAS LINE SCREENS

Essex Six all Models 1925-27 equipped with vacuum tank fuel feed have two gasoline strainers in the gas line from the supply tank to the carburetor. One strainer is located in the top of the vacuum tank, Fig. 2, and the other is at the carburetor. To clean the strainer in the top of the vacuum tank, disconnect the gas line from the point at which it enters the vacuum tank and re-

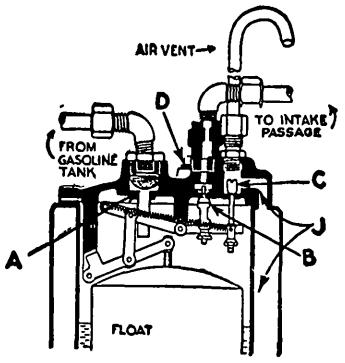


Fig. 2
Upper half of vacuum tank showing position of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

move the elbow and bushing together with the gasoline strainer. Wash with gasoline and blow clear with air.

To clean the gasoline strainer at the carburetor, remove the strainer plug, take out the screen, wash the screen and strainer plug in gasoline and blow clear with air. Make sure when reassembling, that the gaskets are in place and that all connections are tight.

Essex Six 1928-30 equipped with vacuum tank fuel feed, have a glass sediment bowl under the vacuum tank which contains a gasoline strainer and another screen at the carburetor. To clean the glass bowl at the bottom of the vacuum tank, loosen the thumb screw, swing the bracket to one side and remove the bowl. The flow of gasoline from the tank is automatically shut off when the glass bowl is removed.

To clean the strainer at the carburetor, remove the strainer plug, take out the screen and see that the strainer body gas connection fittings are free from dirt. Wash the strainer in gasoline and blow clear with air.

Carburetor Specifications

FLOAT LEVEL

Two makes of carburetors have been used on Essex automobiles from 1925 to 1930 inclusive. The early models were equipped with Stewart carburetors. The later 1929 and 1930 models are equipped with Marvel carburetors.

Stewart Model CR–1925.—On the early models equipped with Stewart carburetors, very little difficulty was experienced with float level adjustment. If the float level changed in service, check for worn counterweight levers. The constant contact of the counterweight levers against the top of the float will cause them to wear after a long period of service to a point of where the gasoline height in the float bowl may change. When this condition is encountered, the float needle assembly may be removed by removing the float bowl cover. Remove the pins holding the counterweight levers in place and reverse the counterweight levers. If both sides of the counterweight levers are worn, replace the levers with new parts.

The correct level of gasoline in the float chamber is ¾" below the top of the float bowl. This measurement can be taken by shutting off the flow of gasoline into the carburetor. Remove the float chamber cover and depress the float with a flat steel scale until the gasoline meets the end of the scale, then note the distance from the top of the float to the top of the float bowl.

If it should be found necessary to change the height of the gasoline level and reversing the counterweight levers above the float will not correct the trouble, unsolder the collar on the gasoline needle valve and slide the collar up or down to the desired position, then resolder the collar to the needle valve.

Marvel Model V.—The float level height on Marvel carburetors is measured at a point directly under the air adjustment screw with the float in the raised position. The correct float level measurement is 5/16" from the top edge of the float bowl to the top of the float.

CARBURETOR SPECIFICATION DIAGNOSIS

Two makes of carburetors came as equipment on Essex Six automobiles from 1925 to 1930 inclusive. On the early models equipped with Stewart carburetors, all fuel adjustment changes are made through manual or automatic adjustment so that the specification diagnosis information consists mainly of a thorough inspection for wear of all parts when trouble is experienced. The desired fuel metering effect is accomplished by extending the lower end of the main nozzle (A) down over a tapered metering pin (J) Fig. 4. The fuel nozzle is mounted in and moves with the air valve, therefore, as the valve lifts, the size opening at the metering point is gradually increased so as to admit an increased amount of fuel with the increased opening of the air valve.

In the case of the Marvel carburetor used on late models Essex 1928-29-30, jet specifications are determined by flow meter measurement. These carburetors are correctly calibrated at the factory and are not easily changed. The specification diagnosis consists mainly of inspecting parts for wear.

STEWART CARBURETORS

Inspection Instructions.—In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle and inspect as follows:

1. The air valve should work freely in the air valve guide. If the valve sticks in the guide, the motor will be hard to start and will not idle properly. Sticking in the guide is most generally caused by dirt or grit.
2. See that the metering pin is not bent or loose in the rack. Cases may be encountered where someone unfamiliar with the proper repair procedure has dismantled the carburetor and in assembling, jammed the metering pin into the aspirating valve with such force that an

attempt at adjustment may have broken the metering pin loose from its anchor in the metering pin rack. Also the metering pin may have been bent by careless handling when assembling the carburetor.

3. If the pinion gear is badly worn, it should be replaced with a new gear.
4. Check for worn or leaky needle valve and seat.

MARVEL CARBURETORS

A Marvel Model V carburetor was used on Essex cars in 1929 and 1930. This model carburetor introduced the first by-pass installation which carries the mixture from the low speed nozzle to a point above the throttle valve during the part choke period after starting, (see Fig. 6 and 7). This device is to provide an increased idling speed with a cold engine automatically without opening the throttle.

The carburetor construction employs a main body or mixing chamber in which are mounted two nozzles which proportion the amount of gasoline used in the mixture. These nozzles are both of the fixed opening non-adjustable type. One is called the low speed nozzle (S) Fig. 9 and is situated in a fixed air opening and is controlled by the venturi while the other called the high speed nozzle (I) is controlled by the automatic air valve and is located under same. An air valve screw is provided which regulates the pressure of the air valve spring against the air valve plunger. This constitutes the only mixture adjustment on the carburetor. The air valve is connected to the plunger through the medium of a rod and the whole assembly is called the dash pot.

Jet sizes for the jets used in the carburetors used on Essex cars are determined by flow meter measurement. These carburetors are correctly calibrated at the factory and are not intended to be changed. The specification diagnosis consists mainly of inspecting parts for wear.

Specification Diagnosis

(Marvel Model V)

Inspection Instructions.—In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle, thoroughly clean all jets and passages and inspect as follows:

Air Adjustment Screw: Inside of screw should be smooth. Clearance between plunger and shell should not exceed .006". Cases may be encountered in service where the air valve plunger sticks in the air valve screw due to the fact that there is not sufficient clearance between the plunger and screw. When this trouble occurs, the air valve screw should be reamed out with a special stub reamer .719" in diameter as shown in Fig. 3. Extreme care should be exercised when reaming out the air valve adjustment screw not to get the clearance too great between the inner surface of the screw and the air valve plunger.

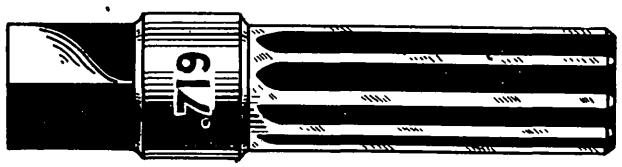


Fig. 3

Special stub reamer used to ream out air valve adjusting screws as used on Marvel carburetors for Essex cars. Care should be exercised when reaming out the adjusting screw that the clearance between the inner surface of the screw and the air valve plunger does not exceed .006".

Air Valve Spring Specifications: If the air valve spring is made with a number of closed coils at the center section and is zinc plated, it should have a free length of 1½". If the air valve spring is made without a number of closed coils at the center, it should have a free length of 1 1/16". (See information below under Air Valve Spring).

Air Valve: The air valve should be free on its shaft but have very little play. Contact of the valve on the carburetor body should show contact for the entire curved portion.

Air Valve Spring (Marvel Model V).—The air valve spring is located in the air valve adjusting screw between the air valve plunger and the head of the adjusting screw. The purpose of the air valve spring is to control the action of the air valve through the full range of operation of the motor.

Diagnosis, Air Valve Spring Weak or too Short.—If the air valve spring is weak or too short, the car owner will probably complain of a poor idling condition and that the motor has no power or pick up. The idle adjustment should be approximately correct when the head of the adjusting screw is flush with the ratchet spring and if it should be necessary in order to make the car idle properly to screw the adjusting screw in an excessive amount, the air valve spring will probably be found to be weak.

On the other hand, if someone has stretched the air valve spring or has replaced it with a spring of the wrong dimension, the car may idle properly but hesitate and Roll at speeds and on acceleration.

Do not, under any consideration, attempt to correct a condition caused by a weak air valve spring by stretching the spring. These springs are specially constructed to deliver a certain amount of resistance to the air valve plunger at various speeds and if the original spring is stretched or distorted in any way, it will not work properly and will throw the carburetor out of balance.

Main Discharge Jet (Marvel Model V).—The main discharge jet or low speed nozzle furnishes fuel to the motor at idling and low speeds. This nozzle is mounted in the center of the venturi block as shown at (S) Fig. 9.

Diagnosis, Low Speed Nozzle too Small.—A low speed nozzle that is too small will cause the motor to Hunt or run rough from a lean mixture. To check out this condition, start with the air valve screw set flush with the ratchet spring. That is, the end or head of the air valve adjusting screw should be just-even with the end of the ratchet spring. Next, screw the air valve screw in one turn. If the motor still runs rough, the main discharge jet is probably too small. When the carburetor is properly adjusted, the air valve just hangs off its seat and screwing the air valve adjusting screw in one full turn pushes the air valve over against the wall of the carburetor. This shuts off the air and

has a tendency to draw more gasoline from the main jet.

Caution: Before changing the jet to a larger size, make sure that the nozzle opening is not plugged up with dirt.

Diagnosis, Low Speed Nozzle too Large.—A low speed nozzle that is too large will generally cause the motor to Roll and load. To check for a low speed nozzle that is too large, set the head of the air valve adjusting screw flush with the end of the ratchet spring. Next, screw the air valve screw out one full turn from this position. If the motor has a tendency to smooth out, the low speed nozzle may be too large, but in extreme cases the motor may still Roll and load even after the spring tension has been relieved.

In either case whether the main discharge jet is too large or too small, the motor may have a tendency to die after acceleration.

High Speed Jet (Marvel Model V).—The function of the high speed jet or nozzle is to supply fuel to the motor at high speeds, in conjunction with the low speed jet. The action of the high speed jet is controlled by the automatic air valve and the fuel metering valve which is operated by the carburetor throttle. The metering valve provides the maximum fuel feed to the high speed nozzle when the throttle is fully open for high speed, hill power and for quick pick up. This valve is entirely automatic and requires no adjustment.

Diagnosis, High Speed Nozzle too Small.—A high speed jet or nozzle that is too small will cause the motor to run rough at intermediate speed and lack power under full load or at high speed, generally accompanied by backfiring through the carburetor and fittings. This condition will also have a tendency to cut down the revolutions per minute of the motor under a full throttle service floor test.

Diagnosis, High Speed Nozzle too Large.—A high speed nozzle that is too large will generally be indicated by low gasoline mileage. In extreme cases where the jet is much too large, the carburetor may have a tendency to Roll and load on a hill. However, if the trouble is not exaggerated enough to cause the motor to Roll and load the only symptoms will be low gasoline mileage. To check the trouble, try a smaller high speed nozzle.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. cyl.	Bore and stroke	Carb. Model and size
ESSEX					**STEWART**
1925	Six	Own	6	2 11/16" x 4 1/4"	CR-25 1"
1926	Six	Own	6	2 11/16" x 4 1/4"	CR-25 1"
1927	Six	Own	6	2 11/16" x 4 1/2"	CR-25 1"
1928	Six	Own	6	2 11/16" x 4 1/2"	CR-25 1"
					MARVEL
1929	Super Six	Own	6	2 3/4" x 4 1/2"	V1 1/8"
1930	Super Six	Own	6	2 3/4" x 4 1/2"	V1 1/4"

ADJUSTMENT PRECAUTIONS

The adjustment information for carburetors used on Essex automobiles from 1925 to 1930 inclusive is given by carburetor model rather than by car model. Refer to the table of Motor Specifications above if it is desired to know what make and model of carburetor was used on any particular car model.

Gasoline mileage and motor performance are dependent more than ever before upon correct tune-up and carburetor adjustment. Therefore, it is suggested that the special information with reference to tune-up at the front of this section and the special adjustment information found below, be closely observed.

Affect of Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds' time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving as the adjustment is changed and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point where the motor runs smoothly. This is especially true of idle and range adjustments and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the point where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Special Points (Stewart Carburetor).—Carburetor adjustment on Stewart carburetors is accomplished by means of a metering pin that is raised and lowered through the medium of a pinion and rack. In practice it is necessary sometimes in order to obtain a correct adjustment, to change the relationship of the rack to the pinion. Complete information for the correct adjustment procedure when this change is necessary, will be found under the heading Hand Regulator Bell Crank adjustment in the Stewart Carburetor section below.

If the carburetor has been dismantled for any reason, and the hand regulator bell crank has been removed, it will be found necessary to reset the metering pin adjustment. Complete information on the correct procedure for this operation will be found under the heading Resetting Hand Control Bell Crank after the carburetor has been dismantled for cleaning or repairs, in the section under Stewart Carburetors below.

Air Valve Failure.—On Essex cars equipped with either Marvel or Stewart carburetors, difficulty may be experienced in obtaining a correct adjustment due to a failure of the air valve action.

On Stewart carburetors, this trouble may be the result of a sticky air valve, Fig. 4, caused by dirt between the dash pot piston and the cylinder walls. To correct this trouble, dismantle and thoroughly clean the carburetor. A sticky air valve may also be caused by a bent metering pin in which case the metering pin should either be trued up or replaced with a new part.

On Essex cars equipped with Marvel carburetors, a failure of the air valve action may be the result of a weak air valve spring. This spring is located just under the air valve adjustment screw and provides the tension against which the air valve piston works. If this spring becomes weakened in service or if too short, the action of the air valve will be affected.

Never, under any consideration, should this spring be stretched. If it is found to be too short or has weakened in service, replace with a new spring of the correct dimensions (see Carburetor Specifications).

STEWART CARBURETORS

A proper adjustment cannot be obtained unless all parts of the carburetor are working properly. If difficulty is experienced in obtaining a correct carburetor adjustment, see information under Inspection Instructions in the Carburetor Specification Diagnosis Section.

Adjustment.—There is but one point of adjustment (V) Fig. 4 and 5 to the carburetor. This adjustment varies the relative height of the metering pin to the opening of the aspirating tube or spray nozzle (O) when the dash control ratchet on the instrument board is in regular running position.

The tapered metering pin (J) is subject to control within fixed limits by means of the dash control button located on the instrument board for the purpose of obtaining a rich mixture for starting. Run the motor until it is thoroughly warm. Accelerate the engine by opening the throttle quickly. If a "popping" sound is not heard, turn the adjusting screw (V) anti-clockwise (up) until a popping sound is heard when the throttle is opened quickly. After the popping sound is heard the screw should be turned clockwise (down) a few notches at a time until the popping is just overcome. The best adjustment will usually be found at this point. It is very important when making this adjustment that the spark lever be retarded half way. In some cases, it may be found necessary to remove and reset the arm on pinion shaft (Y). If sufficient adjustment cannot be obtained by the travel of the adjusting screw, the following adjustment should be made:

Pinion Shaft and Lever Adjustment.—Ordinarily, a sufficient range of adjustment can be obtained by means of the screw (V) Fig. 4 and 5. In the event, however, that the mixture cannot be made sufficiently lean by turning the screw all the way up or sufficiently rich by turning it all the way down, this condition can be overcome by shifting the pinion shaft (Y) in relation to the lever (K). To make this adjustment, first mark the present position, then loosen the adjusting lever clamp screw (U). With the engine warmed up and running with retarded spark, make the adjustment by rotating the pinion shaft by the screwdriver slot in its end to the left for a lean mixture and to the right for a richer mixture. Next, tighten the adjusting arm clamp screw and make final adjustment in the regular manner with the adjusting screw (V). It is well to have the adjusting screw (V) in the center of its adjusting range while changing the position of the bell crank arm as described above.

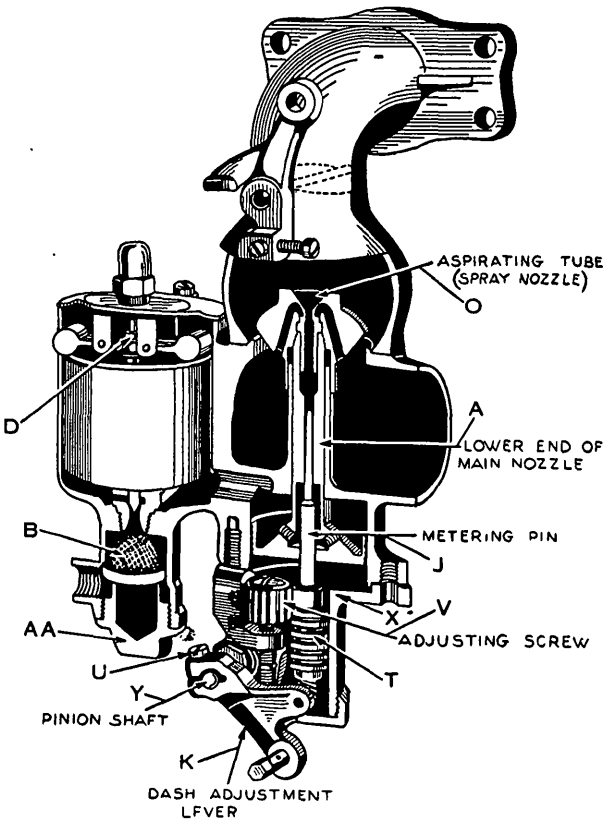


Fig. 4

Cross section view of Stewart carburetors used on Essex automobiles. Only one adjusting screw is provided on this carburetor as shown at (V). This adjusting screw controls the height of the metering pin (J) through the medium of the dash adjusting lever (K).

In case the location of the adjustment arm is completely lost, it can be restored by the following method:

Resetting Hand Control Bell Crank after Carburetor has been Dismantled for Cleaning or Repairs.—If the carburetor has been dismantled for any reason and the hand regulator bell crank (K) Fig. 4 has been removed, reset in the following way. Turn the pinion shaft (Y) to the right until the air valve just lifts off its seat then turn to the

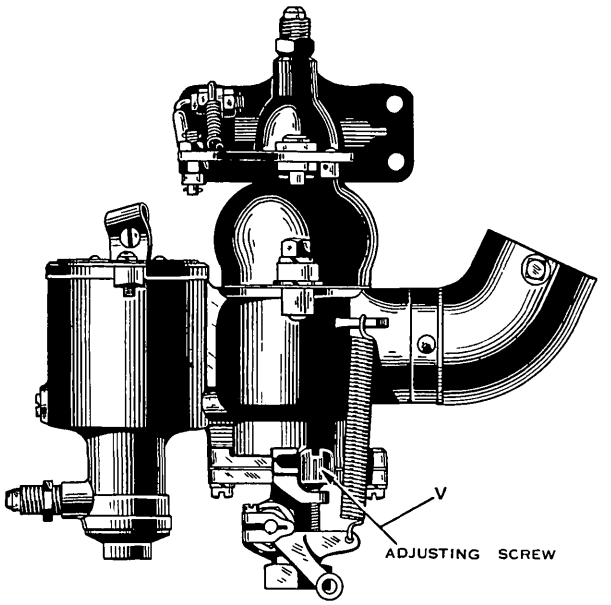


Fig 5

External view of Stewart carburetor used on Essex cars showing position of throttle valve levers and adjusting screw. Only one adjustment is provided on these carburetors at the bottom as shown at (V). Screwing this screw up leans the mixture and screwing it down richens the mixture.

left until the valve comes to rest on its seat. Continue turning to the left a very small fraction of a turn or until there is a very slight clearance between the upper end of the metering pin and its seat. With the pinion shaft in this position, install the dash adjustment lever (K). Another more accurate way to make this adjustment is as follows:

Detach the carburetor from the motor and remove the throttle body or upper half by unscrewing the two cap screws that hold the upper and lower bodies together. This will expose the metering valve head, then with the adjusting arm (K) released by loosening the clamp screw (U) and the cap of the gear housing removed, the pinion shaft should be turned so that the metering pin will be forced up until it just starts to lift the air valve from its seat. Measure the distance between the end of the gear housing and the bottom of the rack, which carries the metering pin and slides within the gear housing. With a steel rule, next turn the pinion shaft just enough to lower the metering pin rack down 1/16" then with the adjusting screw (V) down one half its travel, replace the dash adjustment lever (K) and clamp it tight by means of the screw (U). This will give an approximate adjustment so that the motor can be easily started. After bringing the motor up to normal temperature, the final setting should be made by means of the adjusting screw (V).

Caution: Connect the dash control button wire to the dash adjustment lever (K) so that the arm stop rests against the adjusting screw, with the control button about ⅛" off the dash. Otherwise a rich mixture may be the result. At normal driving temperature, the button should be completely pushed in or depressed. When making a carburetor adjustment, see that the choke is fully in and that the dash adjusting lever arm rests firmly against the adjusting screw. If the choker wire prevents this, adjustment will not be effective.

MARVEL CARBURETOR

(Model V)

Choker and By-Pass.—A choke button is provided on the instrument board to assist in starting. Pulling out this button does two things in the carburetor. First it closes a butterfly choker valve in the air inlet of carburetor which restricts the air opening and consequently produces a very rich mixture for starting. Second, through inter-connection of the choker lever and by-pass valve, Fig. 7, this motion likewise opens a passage between mixing chamber just above low speed nozzle and the intake manifold passage just above the throttle. Due to the higher suction existing above the throttle, the over rich starting mixture is therefore immediately drawn through the fixed opening in the by-pass valve up past the throttle and on into the engine. Partial release of the choker button on the instrument board after starting, releases the choker valve so that it positions itself to the needs of the engine by the action of the compensating spring attached to the choker valve. The spring allows the valve to open or close automatically depending on the engine speed or quantity of air passing through the carburetor. This partial release of the choker button does not, however, change the position of the by-pass valve opening which remains open, and the engine therefore runs at an increased idling speed during this period the same as would be obtained if the throttle were manually opened slightly and there was no by-pass valve. This gives the car a speed of approximately 14 to 15 miles per hour on the road automatically without the necessity of opening the throttle and is of great assistance in getting under way after starting a cold engine.

As soon as the engine is sufficiently warmed up to drive with control button completely released, the by-pass valve returns to its normal position as shown in Fig. 7 and the choker valve is automatically locked in the wide open position.

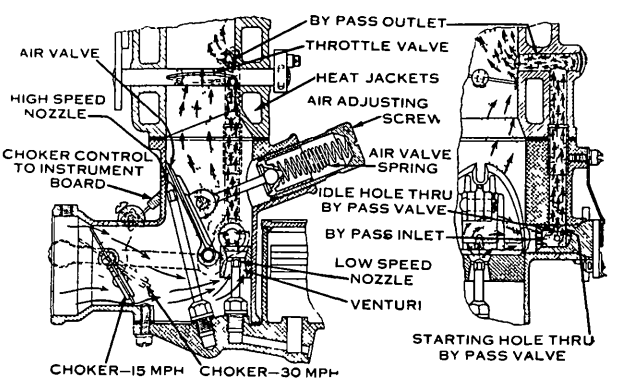


Fig. 6

Sectional view of Marvel carburetor used on Essex showing choke valve in the fully closed position with the by-pass valve opened, so that gas passes to an opening above the throttle.

It will be noticed that there is still a very small hole in the by-pass valve in this position connecting to the passage above the throttle. This is to provide for a proportion of the idling mixture to pass above the throttle as shown in the illustration, stabilizing the idling action of the engine and insuring positive idling performance especially in cold weather.

Some idling mixture is, however, allowed to pass in a normal way past the throttle and by the regulation of this amount and adjustment of the throttle opening the desired idling speed is obtained.

Accelerating Device.—The accelerating device is of the "prolonged shot" type and consists of a positively connected disc (R) mounted on a plunger shaft (S) Fig. 8 and 8A, which is connected to the throttle and supports a loose plunger (W) which is free to move on the plunger shaft (S). On sudden opening of the throttle, the three above mentioned units move downward. The disc

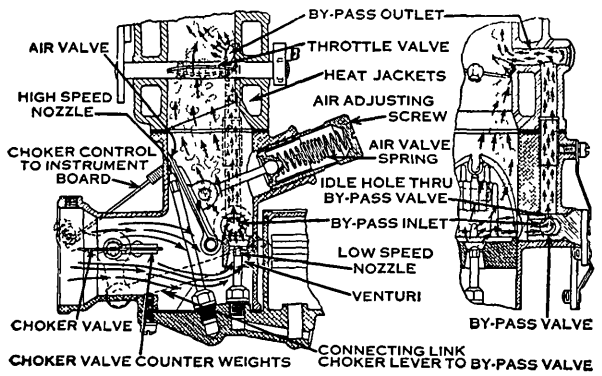


Fig. 7

Showing choker in normal open position and idle action through by-pass valve in normal running position. When the choker valve is only partially open, the by-pass valve remains in the open position thus providing a richer mixture to the intake manifold.

(R) moves away from the plunger (W) and starts forcing fuel through the high speed nozzle but allows a considerable portion to escape past it through a series of holes which fuel is then acted upon by the plunger (W) later falling by virtue of its weight, thus keeping pressure on the accelerating fuel charge over a period of several seconds.

This greatly facilitates getting into action in extreme cold weather.

The accelerating pump device also promotes the same favorable result in more moderate weather when it is desirable to have the heat control set at medium or cool for hard country driving.

Seasonal Heat and Accelerating Pump Controls.—Season control on top of fuel bowl should always be set on "Winter" in cold weather and heat control in warm position.

If, as warm weather comes on, car performance appears sluggish, leave the pump control on "Winter" and put heat control in "Medium" position. If this is not sufficient then put the pump on "Summer" setting.

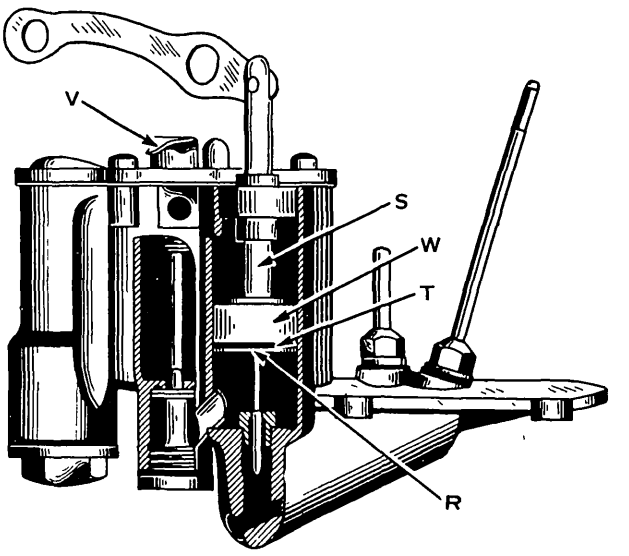


Fig. 8

Cutaway view of section of Marvel carburetor used on Essex automobiles. The plunger (W) is free to move on the shaft (S). The disc (R) has several holes in it which permits gasoline to pass through when the plunger shaft (S) is suddenly forced down. The pressure of the gasoline passing through the disc (R) causes the plunger (W) to lag and thus a prolonged charge of gasoline is forced into the carburetor mixing chamber. (See Fig. 8A).

In very warm weather or in tropical climate or with high test fuel it may be necessary to take the final step:—Leave pump on "Summer" and put heat control in "Cool" position. This is the setting to supply the heat and the least fuel for the accelerating charge.

Carburetor Adjustment (Marvel Model V).—No change should be made in carburetor adjustment until after an inspection has been made to

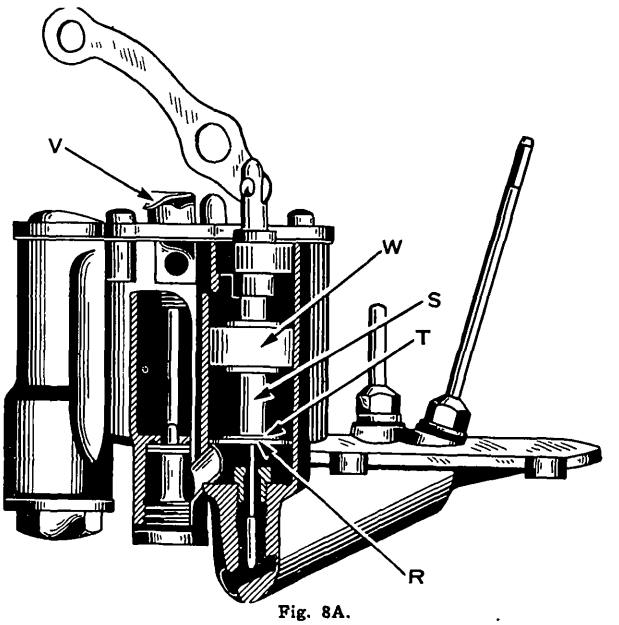


Fig. 8A.

Cutaway view of Marvel carburetor used on Essex automobiles showing the position of the plunger (W) immediately after the shaft (S) has been suddenly depressed. The plunger (W) lags behind and falls of its own weight thus prolonging the duration of the accelerating charge of gasoline. (See Fig. 8).

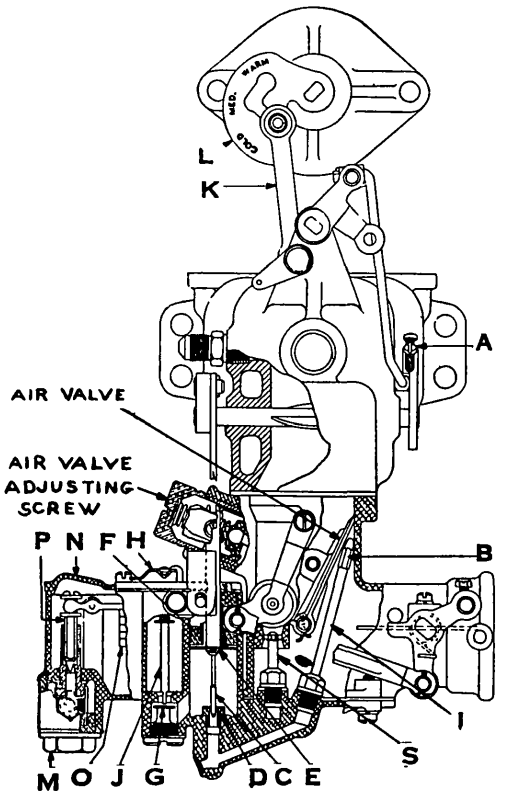


Fig. 9

Sectional view of Marvel carburetor used on Essex automobiles. This carburetor has one adjustment which controls the action of the air valve as shown. The low speed jet (S) located under the venturi block supplies gasoline for idling engine speed while the nozzle (I) located under the air valve supplies gasoline for high speeds only.

determine whether the trouble is in some other unit. It should be noted that the gasoline line and strainers are clear, that there is gasoline in the vacuum tank, that there are no leaks in the connection between the carburetor and engine and that the ignition system is in proper condition. Also, see that the compression is even in all cylinders.

If it is necessary to test adjustment or to make a readjustment of the carburetor, proceed as follows: Set air screw, Fig. 9, so that the end is flush with the end of the ratchet spring bearing against the side of the screw.

Next, set heat control in "Warm" position and leave in this position while making adjustment. Pull out choker to closed position and start engine in usual manner. As soon as the engine has fired, slightly release choker, run for a few moments until the engine has warmed up, remembering never to use the choker more than is necessary since when it is not needed, it has a tendency to foul up the engine and ruin the lubricating oil in the crankcase.

Next set the air screw for good idle by either turning in to the right a little or backing out to the left as the needs of the engine require. When the engine is warmed up, the adjustment of the air screw for proper idling is easily accomplished by using a little care. If the air screw is turned in too tight, the motor will Roll or appear sluggish. If the air screw is not tight enough, the motor will hesitate and stumble and perhaps stop entirely. To make a nice clean adjustment for idle, turn the air screw back to the left until the engine hesitates indicating that the mixture has too much air and is too lean. Next, turn the air screw in to the right three or four notches at a time until the engine runs smoothly. This idle setting, accomplished by proceeding as directed above, the proper carburetor adjustment for the entire range of the engine will have been obtained.

If the engine idles too fast with the throttle closed, the latter may be adjusted by means of the throttle lever adjusting screw.

ALTITUDE CHANGES

No change is necessary for touring through mountainous country but for cars operating permanently in territory above 4000 feet elevation or over. We advise changing the high speed jet to a No. 49-110-C-30 for the best results in such territory.

Do not, under any circumstances, make this change unless operating permanently above 4000 feet elevation.

MANIFOLD HEAT CONTROL

(Marvel Model V)

The carburetor and manifolds have been designed to utilize the exhaust gases of the engine and to insure complete vaporization and consequent minimum consumption of fuel. This is accomplished by an exhaust jacket in a double walled elbow casting placed between the carburetor and the intake port in the cylinder block. This elbow casting is connected to the exhaust manifold in such a manner that the exhaust gases pass between

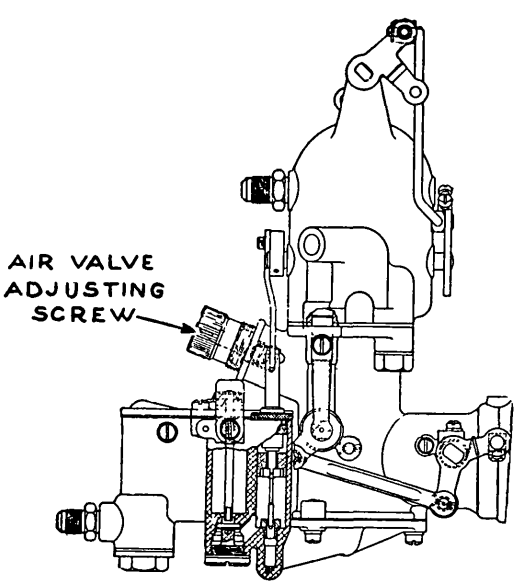


Fig. 10

Cross section view of Marvel carburetor used on 1929 Essex automobiles.

the walls of the elbow, through the heat jacket and back to the exhaust manifold. The amount of heat thus furnished to the elbow is controlled by a damper valve in the main exhaust above the elbow and situated between the ehaust outlet and the exhaust inlet to the elbow heat jackets.

The damper valve in the main exhaust is connected to the throttle lever of carburetor in such a manner that the greatest proportion of heat is deflected to the jackets of the elbow when the throttle is only partly open, as in idling and at low speeds, and a decreasing amount as the throttle is opened further for higher speeds. By means of the heat control lever attached to the damper valve this automatic action of the damper valve may be varied to suit weather and driving conditions.

An adjustment for seasonal control of heat also is provided on the damper valve lever (J), Fig. 10, whereby the amount of exhaust heat deflected by the damper to the elbow jackets may be decreased by moving damper adjusting stud (L) in damper connecting rod (K) from hook-up hole in damper lever marked "Warm" to hook-up hole marked "Medium", or to hook-up hole marked "Cool", thus initially opening damper valve at closed throttle positions and greatly reducing the heat application.

Gases from the exhaust manifold are deflected by the damper valve (A) and pass through the extension (C) of the exhaust manifold into elbow jackets (D), passing around dividing wall or baffle (E), circulating around carburetor throttle, and back up through passages (D), and again into the exhaust manifold on.the rear side of valve (A), and thence in the normal way to the muffler.

It will be noted that the valve (A) is connected by means of damper lever (J), and damper connecting rod (K) to the driver lever (I), which is fastened to the same shaft as the throttle bell crank (G), which is connected by means of throttle connecting rod (H) to carburetor throttle lever

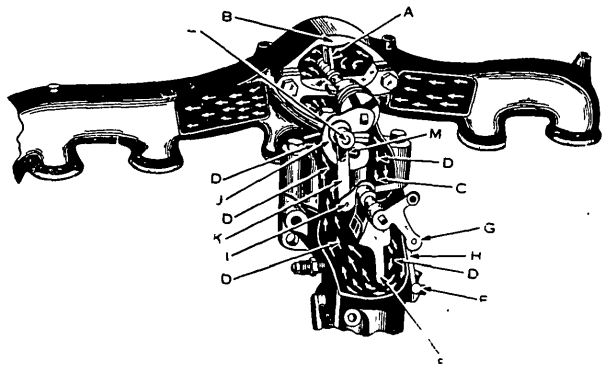


Fig. 11

Cutaway view of Marvel carburetor heat control manifold as used on Essex automobiles. Care should be exercised to see that this manifold control is properly adjusted in order to obtain most efficient carburetor operation. (See instructions for adjustment).

(F). Movement of the accelerator lever when driving, which is fastened to the throttle bell crank, is therefore transmitted simultaneously to carburetor throttle and exhaust damper valve. As the throttle is opened, valve (A) is also opened, due to this interconnection. Thus the volume of heat through heat jackets of elbow will be lessened as the engine speed is increased, the amount of decrease depending upon position of damper lever adjusting stud (L) in damper lever (I)—whether in hole for "Warm", "Medium", or "Cool" position.

It should be remembered that the adjustment of heat control is purely seasonal, and this adjustment largely controls the car performance, or the effect of a "rich" or "lean" action in the carburetor. Therefore, in cold weather, drive with adjustment set at "Warm" to provide quick warm-up after starting, and sufficient heat for good performance. In extremely warm weather, place adjustment at "Cool", and for all intermediate seasons, at "Medium" for most normal driving.

Erskine 1927-30

Motor Tune-Up

When tuning an Erskine motor, particular care should be exercised to see that the contact points are free, properly spaced and correctly timed. The spark plug gaps should be correctly adjusted (see Ignition Timing table) and the timing chain should be properly adjusted. (See Timing Chain Adjustment).

Following the tune-up operations will be found special information pertaining to motor tune-up. This information should be closely observed for best results.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.

   Note: To check the timing chain for slack, remove the generator cover band and rock the generator armature. If the generator armature can be rocked for a distance greater than the width of one commutator bar, the chain should be tightened. Loosen generator flange bolt and move the generator away from the motor block until the slack is removed from the chain. The generator can be moved out by means of a set screw through the outer flange bolt hole. It should be borne in mind when adjusting the timing chain that the chain will not hum at any stage of the adjustment.
3. Check the ignition timing; adjust if necessary.
4. Adjust the valve tappets and free up valves.
5. Clean gas line strainers and screens; also check gas lines for loose fittings.
6. Check fan belt; adjust if necessary.
7. Tighten water pump nuts. This operation is only necessary when packing gland is leaking.
8. Adjust carburetor; clean if necessary.

   Note: If difficulty is experienced in obtaining a correct adjustment, the carburetor should be removed from the car and thoroughly cleaned. If car owner complains of motor failing on a hill by cutting out and missing, check for water in the carburetor. (See Adjustment Precautions under Carburetor Adjustment).
10. Road test car.

    Note: If after the car has been driven from 6000 to 8000 miles a spark knock occurs the cylinder head should be removed and the carbon scraped out. If the combustion chamber is free of carbon the ignition should not knock except under full load condition.

Ragged Idle

Choke Valve.—A poor idling condition on Erskine models may be caused by the choke valve being partially closed. Check to see that the choke valve is in the correct position when the choke button is pushed into the dash.

Needle Valve Seat (Schebler Model U).—A condition of poor idle may be caused by the needle valve seat working down away from the needle. When the needle valve seat works down away from the needle valve assembly the motor will Roll and load from a rich mixture. To correct this trouble, remove the carburetor bowl which will expose the needle valve seat and screw the seat back up to its original position. A cross section view of Model U Schebler showing the needle valve seat will be found in the Carburetor Specification section Fig. 14.

Spark Plug Points.—A condition of poor idle may be caused by spark plug points being set too close. The spark plug gap clearance should not be less than .027" nor more than .030". (See ignition timing table).

Air Leaks.—A poor idling condition may be caused by air leaks at the gasket and around the throttle valve shaft. To check for this condition, use a squirt can full of gasoline. If the motor performance is affected when gasoline is squirted over the edge of the gasket the gasket will be found to leak. Tighten up the manifold flange nuts and if this does not remove the trouble, replace the gasket.

Poor Acceleration

Timing Chain Jumped.—Poor acceleration may be caused by a slack timing chain jumping a camshaft sprocket tooth thus throwing the motor out of time. When this happens, the chain cannot be jumped back; the timing case cover must be removed.

Carburetor.—Poor acceleration may be caused by an improper carburetor adjustment. Two makes of carburetors have been used on Erskine automobiles, namely: Stromberg T-1 and Schebler U (see carburetor adjustment). On cars equipped with Model T Stromberg, poor acceleration may be caused by the accelerating well air bleeder being plugged up or too large.

Another condition which affects motor performance at idle, on acceleration and at speeds is the working loose of the main discharge jet on cars equipped with Stromberg T. This trouble is generally caused by the influence of heat on the two metals composing the body member and the main discharge jet proper. The jet works loose and vibration causes it to work down in the threads until a leak occurs. Motor performance is affected through the whole speed range.

Poor Gasoline Mileage

Poor gasoline mileage and motor performance may be the result of improper or faulty carburetor adjustment, especially on those cars equipped with Schebler carburetors. Before attempting a carburetor adjustment, the special precautions found in the Carburetor Adjustment section should be consulted.

On Stromberg Model T carburetors, low gasoline mileage may be caused by the auxiliary control needle, Fig. 13, not seating properly. Check to see that the choke control does not hold this needle off its seat.

Main Discharge Jet (Stromberg T).—Low gasoline mileage on cars equipped with Stromberg Model T may be caused by the main discharge jet working loose. (See carburetor under poor acceleration above).

Gasoline Leaks

Loose Main Discharge Jet (Stromberg T).—A gasoline leak which may be confused with a leaky float valve and generally indicated by a slow dripping of gasoline or a wet carburetor body may be caused by the main discharge jet working loose.

To correct, remove the hexagon nut at the bottom of the carburetor and screw the jet up tightly against its seat.

GAS LINE SCREENS

Erskine Models 1927-29 were equipped with vacuum tank fuel feed and were provided with two strainer screens in the gas line. One strainer located in the top of the vacuum tank, Fig. 1, can be cleaned by disconnecting the fuel feed line and removing the elbow and bushing. The other strainer is located in the carburetor.

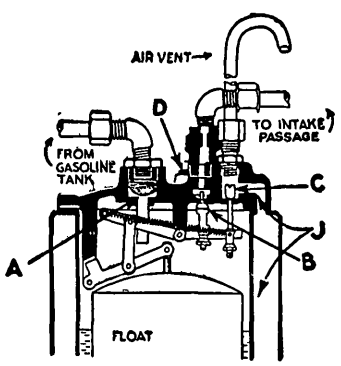


Fig. 1

Upper half of vacuum tank showing position of gas line screens To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

Erskine Model 1930 equipped with a fuel pump feed has a strainer screen located in the glass bowl at the fuel pump, Fig. 2. To clean the screens remove the glass bowl, clean with gasoline and blow clear with compressed air. When replacing the glass bowl be sure that the cork gasket is in good condition and that when the retaining nut is drawn up the bowl rests flat on its seat. If the cork gasket is in any way damaged replace it with a new one and before installing the new gasket soak it in lubricating oil.

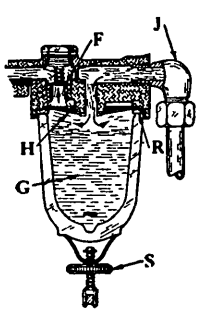


Fig. 2

Sectional view of Stewart-Warner fuel pump showing position of gas line screen (H). To clean, loosen the thumb screw (S), remove the bowl and wash screens in gasoline. When replacing the screen, make sure that the gasket between the glass bowl and pump body does not leak.

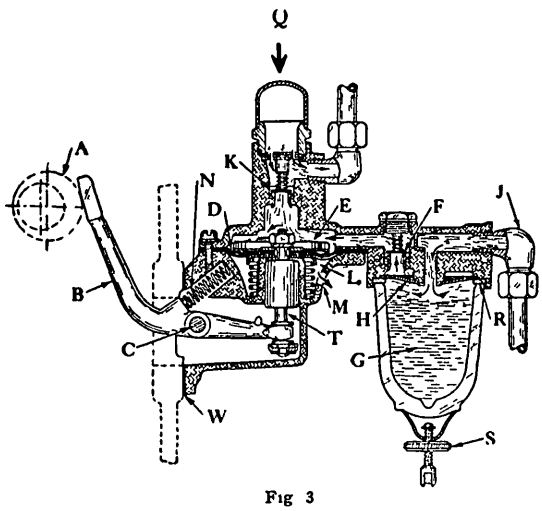


Fig 3

Cross section view of Stewart-Warner fuel pump showing the pump diaphragm on its downward stroke Gasoline is drawn from the fuel supply tank.

FUEL PUMP

Late models of Erskine are equipped with Stewart-Warner fuel pumps. The pump diaphragm is actuated by a lever working in contact with a cam as shown in Figs. 3 and 4. Fig. 3 shows the diaphragm drawn down on the sucking stroke and Fig. 4 shows the diaphragm on the delivery stroke. The diaphragm is drawn down by the actuating arm and forced up by the spring (O) Fig. 4.

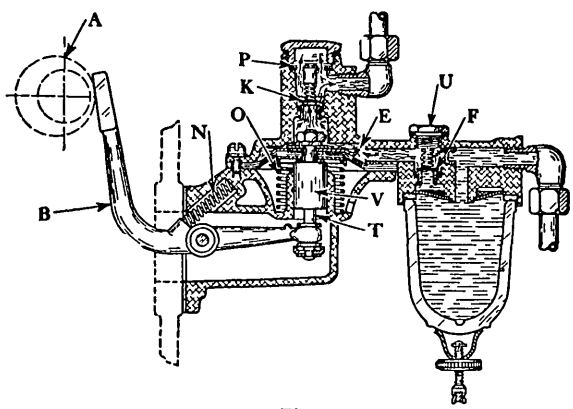


Fig. 4

Cross section view of Stewart-Warner fuel pump showing pump diaphragm in the up or discharged position. On the downward stroke, the gasoline is drawn in to the diaphragm compartment. On the upward stroke, the diaphragm forces the gasoline to the carburetor.

Test on Engine

When gasoline fails to reach the carburetor, do not remove the pump until you have checked up as follows:

1. Learn whether there is gasoline in the rear supply tank.

2. Note whether gasoline has been coming out of breather hole (M). This indicates a leak due to a fractured diaphragm or a leak at the piston.
3. Examine the sediment bowl (G) and screen (H). Although this bowl may be full of gasoline, the pump will fail or not operate properly if screen (H) is dirty or inlet valve (F) is clogged. Clean the sediment bowl and the screen. Observe whether there are any water particles on the screen. They can be removed by blowing through it. This can happen only in extreme cases when the bowl is practically filled with water. When replacing the bowl be sure that the cork gasket is not broken and that when nut (S) is drawn up the bowl rests flat on its seat. A leak at the gasket will cause erratic action of the pump and retard delivery. When using a new gasket, first soak it in lubricating oil.
4. Check for loose connections or broken lines.
5. Disconnect the pump at the line to the carburetor.
6. While having someone step on the starter, observe whether the gasoline spurts out of the pump outlet. When gas spurts out and the carburetor float bowl is empty it is an indication that the line to the carburetor, or the carburetor float needle valve, is clogged.
7. Disconnect the gasoline supply line at both ends and blow through it to see whether it is clogged.

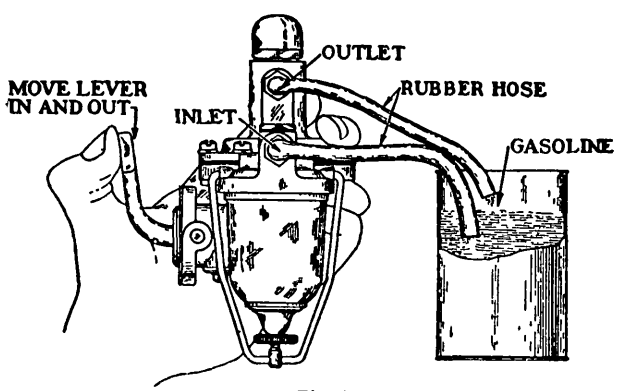


Fig. 5

Showing correct method of testing Stewart-Warner fuel pump with pump off the car. Obtain two pieces of hose and connect one to the inlet of the pump and the other to the outlet of the pump. Place the free end of the inlet hose in a pail of gasoline and move the actuating lever in and out. Gasoline should spurt out of the outlet hose in approximately 15 strokes.

Test of Pump Off the Engine

When the previous test fails to show the trouble, remove the pump and take it to the work bench for test and examination.

1. Attach two pieces of rubber hose to the inlet and outlet openings of the pump and while holding, as shown in Fig. 5, move the pump lever in and out. Gasoline should spurt out of the hose attached to the outlet opening in approximately fifteen strokes of the lever. When no gas spurts out, proceed as follows:
2. Examine check valves (F) and (K) Fig. 3. A gummy substance sometimes found in gasoline may cause the valves or springs to stick, or grit to stick to them, and prevent seating. Any foreign matter on valve seats will also cause failure. Clean the valve seat and the springs, and replace the disc valves, glossy side down. Be careful not to scratch or mar the valve seats while cleaning them.

   Use new gaskets under the valve retaining nut (U), and the air dome (Q). Be sure to draw them up tight.

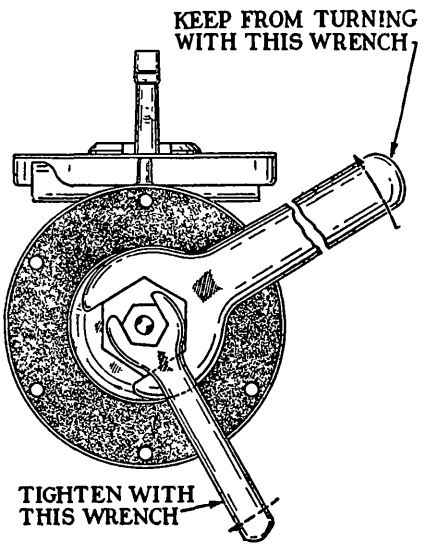


Fig. 6

Top view of pump diaphragm showing method of removing diaphragm locking nuts.

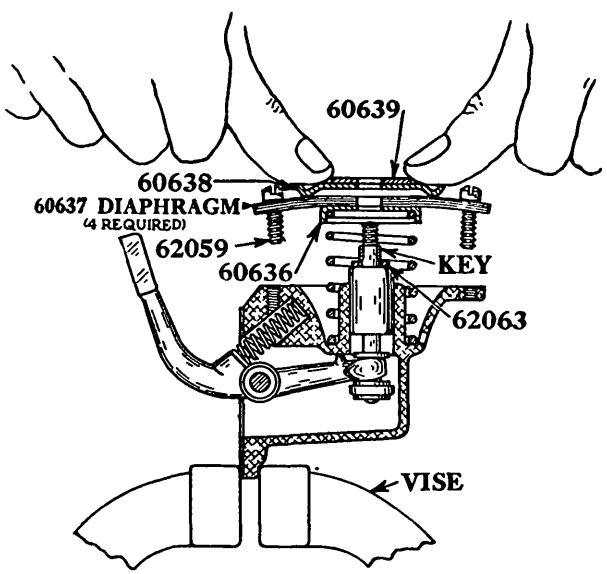


Fig. 7

Sectional view of Stewart-Warner pump showing method of mounting pump in vise while replacing the pump diaphragm.

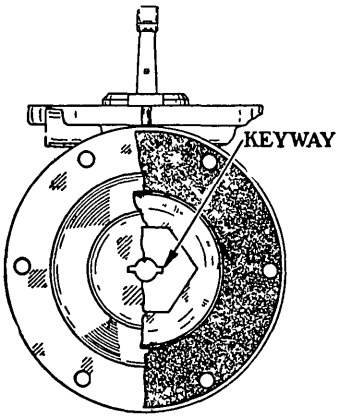


Fig. 8

Top view of Stewart-Warner pump diaphragm showing correct method of installing diaphragm material with keyway in correct position.

3. Examine the vent hole (M) Fig. 3. This must have no restriction from dirt accumulations.
4. Test the pump with two pieces of hose and a pail of gasoline, as previously described; also by holding a wet finger alternately on the inlet and delivery openings while working the lever.

The Diaphragm

When the pump cannot be made to operate properly after the tests previously described, take it apart and examine the diaphragm (D), diaphragm spring (O) and clamping nut. Make sure the nut is tight (see Fig. 4) A weak or broken diaphragm spring or a cracked or torn diaphragm will cause complete pump failure. To correct, replace the diaphragm or spring. This must be done very carefully, and the following instructions must be adhered to to insure satisfactory operation of the new diaphragm:

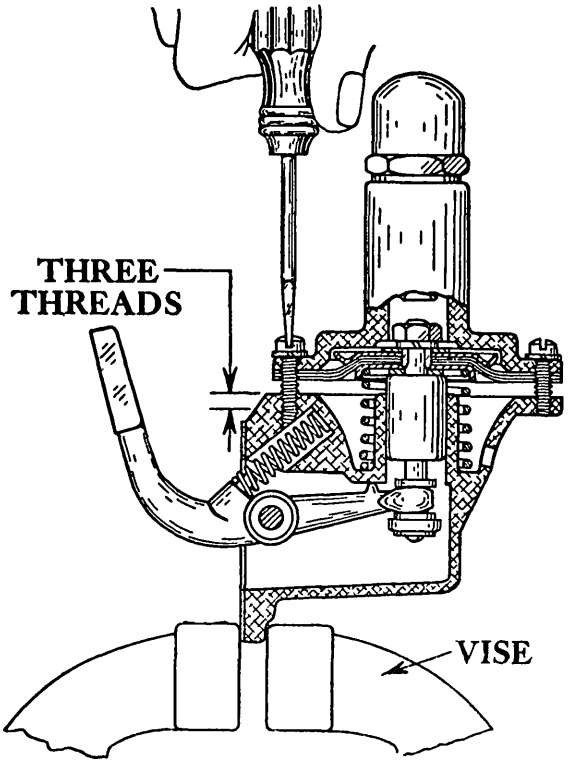


Fig 9

Cross section view showing Stewart-Warner fuel pump mounted in vise in correct position for tightening down diaphragm cover. Note that diaphragm cover screws enter only three threads in pump body Care should be exercised to get the cover screws tight and not strip the threads.

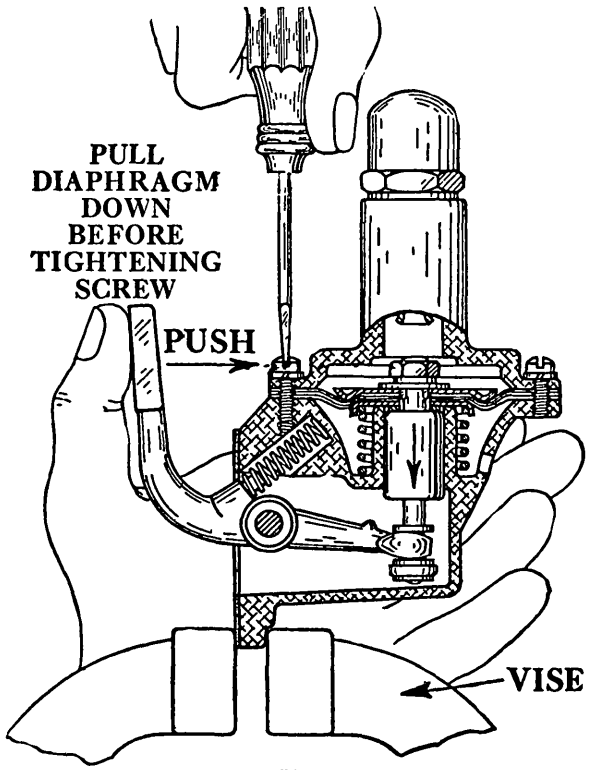


Fig. 10

Cross section view of Stewart-Warner fuel pump mounted in vise showing method of drawing down diaphragm by putting pressure on the actuating arm before tightening down the diaphragm cover screws. This operation is important and should be done as illustrated.

Replacing Diaphragm

1. Remove the pump cover. This will make the nut that clamps the diaphragm on the pump plunger accessible.
2. Unscrew the nut with two wrenches, as shown in Fig. 6.
3. Clamp the body of the pump in a vise, as shown in Fig. 7. Lay four pieces of diaphragm material, P-60637, on top of the spring retainer, P-60636, as shown. Insert two screws, P-52059, through the holes in the diaphragm material to line up these holes with each other. Lay the two washers, P-60638 and P-60639, on top of the diaphragm material. All these parts have two keyways in the center hole Turn the parts so that the keyways are in line with each other and the key on the connecting plunger stud (see Figs 7 and 8) Then press down

on the retaining plate and push these parts over the stud. Make sure that the key enters the keyway. Then, while holding the diaphragm in this position, screw on the retaining nut first by hand and then tighten it with two wrenches, as shown in Fig. 6.

Replace Cover

It is very important that this be done as explained hereafter.

1. Set the cover on top of the diaphragm and then push it down just far enough to allow entering the screws for about three threads, as shown in Fig. 9. Then pull the diaphragm down, as shown in Fig. 10, by pushing the lever in as far as it will go. Hold it there until all screws are tightened securely.

OIL PRESSURE

Model and Year	Min.	Max.
51—1927	15 lbs.	25 lbs.
52—1928-29	15 lbs.	25 lbs.
53—1930	20 lbs. at 30 M.P.H.	

IGNITION TIMING

Models 51 1927, 52 1928-29.—The contact points should just start to break when piston No. 1 entering compression stroke is at top dead center as indicated by the marks on the flywheel with the spark lever at one half advance. (See ignition timing table for contact point setting).

Model 53 1930.—On Erskine Model 53 1930 the ignition is timed by a punch mark located ½" before top dead center on the flywheel rim. The contact points should just begin to separate when No. 1 piston entering compression stroke is ½" flywheel travel before top dead center as indicated by the punch mark on the flywheel rim registering with the indicator of the peephole in the flywheel housing. The spark lever should be set in the full advance position (see Ignition Timing table for contact point setting).

Ignition Timing Table

Complete ignition timing data will be found in the following table for Erskine from 1927 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con Pt. Clear	Fly-wheel Travel	Spark Lever Position		
1927	51	.020"	T.D.C.	½ Adv.	.025"	1-5-3-6-2-4
1928	52	.020"	T.D.C.	½ Adv.	.025"	1-5-3-6-2-4
1929	52	.020"	T.D.C.	½ Adv.	.025"	1-5-3-6-2-4
1930	53	.020"	*½" B	Adv.	.025"	1-4-2-6-3-5

*Ignition timing mark is indicated by prick punch mark on flywheel ½" before top dead center mark for pistons Nos. 1 and 6.

VALVE TIMING

Models 51 1927, 52 1928-29.—To check the valve timing, set the tappet clearance of both valves for No. 1 cylinder at .006". Crank the motor until No. 1 intake valve starts to open and the exhaust valve is just closing. At this point the flywheel mark "E-C" should be under the indicator of the peephole in the flywheel housing.

Models 53 1930.—To check the valve timing use the procedure given for Models 51 and 52 above, with the exception that the tappet clearance for both valves should be set at .010". Reset the tappets to running clearance after timing has been checked. (See valve timing table).

Valve Timing Table

The following table contains valve timing data for all models of Erskine from 1927 to 1930 inclusive. All tappet adjustments are made with hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
1927	51	.006"	.....	.006"	.006"	*T.D.C.	Opens	.....
1928	52	.006"	.....	.006"	.006"	*5°A	Opens	.....
1929	52	.006"	.....	.006"	.006"	*5°A	Opens	.....
1930	53	010"	.....	.004"	.006"	*5°A	Opens	.....

A—After top dead center. T.D.C.—Top dead center.

* All Models of Erskine are provided with flywheel marks for valve timing; also number six cylinder head is drilled and tapped for piston gauge.

TIMING CHAIN ADJUSTMENT

Models 51 1927, 52 1928-29.—Timing chain adjustment is accomplished by loosening the generator support bracket bolts and pivoting the generator away from the motor at the top.

To check the timing chain for slack, remove the generator cover band and rock the generator armature. If the generator armature can be rocked for a distance greater than the width of one commutator bar the chain should be tightened. After the flange bolts have been loosened, the generator can be moved out by means of a set screw through the outer flange bolt hole. It should be borne in mind when adjusting the timing chain that the chain will not hum at any stage of the adjustment.

Carburetor Specifications

FLOAT LEVEL

Stromberg Carburetors

Erskine automobiles from 1927 to 1930 inclusive came equipped with two makes of carburetors. Namely: Stromberg and Schebler. The float level for each model of carburetor is given in the following paragraphs.

Stromberg Model OE-1.—The proper gasoline level with the engine shut off is 1" from the top surface of the float chamber casting, or a point just even with the bottom of the plug hole in the side of the float bowl. (See Fig. 15 Model T).

Should the gasoline level be more than 1/16" higher or lower than the bottom of the hole, the float level should be readjusted.

To adjust the float, remove the valve cap and the upper end of the float needle stem will be exposed. If the gasoline level is too high, loosen the lock nut, hold the needle sleeve from turning by putting a small wrench on the flat side and screw the needle down (clockwise) to lower the level and up (counter-clockwise) to raise the level.

Stromberg Model T-1.—The proper float level with the motor turned off is 7/32″ from the bottom face of the float chamber cover to the top surface of the float or the gasoline level should stand at a point even with the bottom of the level sight hole (M) Fig. 15.

If it should be necessary to readjust the float level, bend the float lever arm up to raise the level and down to lower the gasoline level.

Stromberg U-1.—When the engine is not running, the gasoline level should stand 9/16″ below the top of the float bowl. The distance from the lower surface or gasket face of the cover to the top of the float at the center should measure 11/64″. To readjust the float level, bend the float lever arm in the corner between where it touches the float needle and where it meets the float body. If float is low, bend arm so as to move float upward toward float chamber cover the same distance as the level needs correction. That is, to raise the level 1/16″ bend the float up 1/16″. To lower the level, hold the float arm tight where it touches the needle and bend the float downward away from the float chamber cover.

Schebler Carburetors

Schebler Model U-1″.—The float level should be measured by holding the carburetor upside down and with the float lever resting against the float valve measure the distance from the milled flange on the lower half of the body to the top of the float. This measurement should be 2″ with the bowl gasket removed. To readjust the float level, bend the float lever arm up to raise the level and down to lower the level.

Schebler Model TX-5–1¼″.—To check the float level remove the upper half of the carburetor body and hold it upside down so that the float lever rests against the float valve. Measure the distance from the surface of the body to the top of the float. This measurement should be 1¼″. To readjust the float level, bend the float lever. Make sure that the float assembly works freely after the carburetor has been reassembled. This can be done by removing the drain plug at the bottom of the carburetor bowl and working the float up and down by the aid of a piece of wire or any small instrument through the drain plug hole.

CARBURETOR SPECIFICATION DIAGNOSIS

Two makes of carburetors were used on Erskine automobiles from 1927 to 1930 inclusive. Some of the early models came equipped with Stromberg OE-1 while later models were equipped with Stromberg T-1 and U-1. Beginning with 1928, Schebler carburetors were also used. The first cars came equipped with Schebler U-1″ while 1930 models are equipped with TX-5–1¼″ carburetors.

STROMBERG CARBURETORS

All Stromberg carburetor specifications are given either in wire drill sizes or thousandths of an inch. The main metering jet and economizer by-pass used on Stromberg U are the only specifications that are given in thousandths of an inch. All other dimensions are wire drill sizes. Venturi tube measurements are given in fractions of an inch.

In the following paragraphs, jet specification diagnosis will be found followed by specification tables containing the calibration specifications for each model of carburetor arranged by car model.

Specification Diagnosis

(Stromberg Model OE)

Stromberg Model OE-1.—There are six points at which the internal adjustment of a Stromberg Model OE-1 carburetor may be changed to affect its operation. These points will be considered in their proper order in the following paragraphs. While the external carburetor design for all model OE types may be slightly changed, the principle of operation and internal parts for all types are practically the same.

Idling Discharge Jets (Stromberg OE-1.—The idling discharge openings are made in the carburetor body as shown in Fig. 11 and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets too Large.—If the idling jets are too large, the motor will Roll and load regardless of how much air is admitted through the idle adjustment. Also, the motor will have a tendency to idle fast with the throttle completely closed.

High Speed Adjustment (Stromberg OE-1).—The high speed adjustment will take care of all ranges within the limit of performance of the carburetor. Very little trouble will be experienced

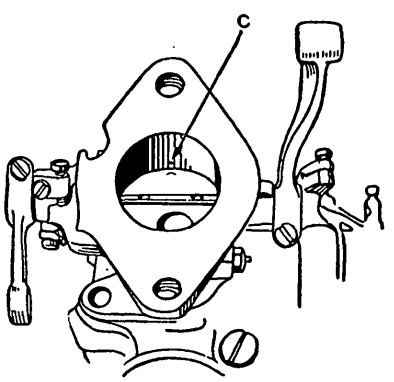


Fig. 11

Top view of Stromberg Model T-1 carburetor showing location of idling jets above the throttle. These jets should not be drilled out under any consideration. If trouble is experienced in obtaining an idle adjustment, make sure that the jet passageways are clean.

with high speed adjustment from any cause other than wear.

Diagnosis, High Speed Adjustment Parts Worn.—Wearing of the high speed adjustment needle and socket will cause a variation or irregular running of The motor at speeds above 20 miles per hour. A loss in gasoline mileage may also be noticed.

To check for worn parts, turn the adjustment back and forth and if a looseness can be felt, the parts will be found to be worn and should be replaced. (See information under adjustment in the Adjustment section).

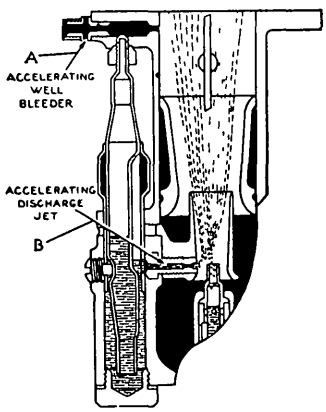


Fig. 12

Sectional view of Stromberg Model O carburetor showing accelerating well and bleeder. The accelerating well is of the manometer type and the gasoline level in the well is controlled by the accelerating well bleeder (A). Note that the well bleeder has two sizes of openings. For winter or cold weather driving the small opening should be screwed into the carburetor body while in summer weather the large opening should be screwed into the carburetor body.

Accelerating Well Bleeder and Discharge Jets (Stromberg OE-1).—Stromberg OE carburetors used as equipment on Erskine automobiles are equipped with the monometer type of accelerating device. The height of the gasoline in the accelerating well is controlled by the size of the accelerating well bleeder. The accelerating well acts only during acceleration, therefore, if all carburetor adjustments have been correctly made and a noticeable flat spot still exists on quick acceleration, the trouble may be due to an accelerating well bleeder or discharge jet of the wrong size.

Diagnosis, Well Bleeder too Large.—A well bleeder (A) Fig 12 that is too large can be indicated by testing the car under quick acceleration on a level road. When the throttle is first opened, the car will accelerate with good power for a short distance and then suddenly hesitate and may backfire.

Diagnosis, Well Bleeder too Small.—To determine whether the accelerating well bleeder is too small, test the car under quick acceleration on a level road. In the first stages of acceleration, the motor will have good power but as the car approaches the desired speed, a tendency to load will be noticed.

Diagnosis, Accelerating Well Discharge Jet too Large or too Small.—If the accelerating well discharge jet (B) Fig. 12 is too small the motor will hesitate and backfire on the first stages of acceleration. If the accelerating well discharge jet is too large, the motor will load from a rich mixture through the full range of acceleration providing the accelerating well bleeder is small enough to keep the gasoline supply in the accelerating well. However, if the accelerating well bleeder is of such size that the fuel is low in the well, the mixture will be rich on the first stages of acceleration, dropping off to a lean mixture after a short period of wide open throttle.

Economizer Needle (Stromberg OE-1).—The economizer needle assists in regulating the flow of gasoline through the main discharge jet by admitting more or less air through the high speed air bleed to suit the requirements of the motor. This needle will seldom give trouble unless someone has tampered with it.

Diagnosis, Needle Lift too High.—If the needle lift is too high the motor will have a tendency to run rough and may sputter in the carburetor at speeds above 40 miles per hour. The economizer needle is shown in the cross section view of Stromberg Model T, Fig. 13.

Diagnosis, Needle Lift too Low.—If the needle lift is too low a condition of poor fuel economy will result. The average needle lift setting is 5/16".

Main Discharge Jet (Stromberg OE-1).—It is seldom in practice that a large main discharge jet will have any affect on car performance other than to lower the gasoline mileage. If car performance is good and gasoline mileage is low, then a smaller discharge jet may be tried.

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet Fig. 13 is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

Economizer Needle Air Bleed (Stromberg OE-1).—On Stromberg OE carburetors used on Erskine automobiles, the fixed high speed air bleed is drilled through the center of the economizer needle. This high speed air bleed and the main discharge jet have been calibrated at the factory to work in perfect balance, therefore, any change of the air bleed should be avoided.

Diagnosis, Economizer Needle Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speed, a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition turned on.

Diagnosis, Economizer Needle Air Bleeder too Small.—If the air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speed.

In most cases, the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10

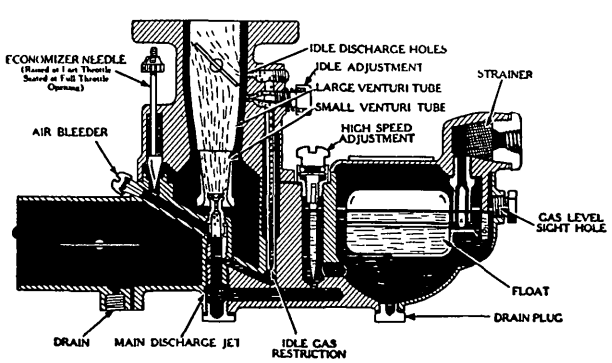


Fig. 13

Cross sectional diagrammatic view of a Stromberg Model T carburetor. The Model T is very similar to the Model O with the exception that on the Model O the high speed air bleed is drilled in the economizer needle while in the Model T the high speed air bleed is a separate opening as shown in the illustration, and the economizer needle is blank.

miles per hour in high gear can be maintained. If the air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Venturi Tube (Stromberg OE-1).—On all Model OE-1 Stromberg carburetors the venturi tubes are removable units and are held into the carburetor body by a set screw and lock nut. In practice, it is seldom that trouble from a venturi of wrong size is experienced. However, if this trouble is encountered, a check to see that the venturi is tight in the body should be made before testing for wrong size.

Diagnosis, Venturi too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Specification Diagnosis
(Stromberg Model T-1)

Stromberg Model T-1.—All Model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and the high speed air bleed but all specifications as to principle of operation and jet diagnosis are the same as the Model O. (See page 161).

High Speed Air Bleeder (Stromberg T-1).—The difference between the air bleed arrangement on Stromberg Model T and O is that the O type has the air bleed needle drilled. The T type has a separate air bleed and the needle is blank as shown in Fig. 13. The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance, therefore, any changes of the air bleeder should be avoided.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speed, a gentle popping in the muffler will be produced similar to the exhaust noise when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In most cases the trouble can be indicated by the same test procedure used to determine whether a main metering jet is too large. The car should be tried out on a hill steep enough that with wide open throttle, a car speed not to exceed 10 miles per hour in high gear can be maintained. If the air bleed is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available on which the car may be tested, and the air bleeder is thought to be too small, first replace the air bleeder with a larger size (not to exceed four sizes larger on the first test). Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance will be improved.

Specification Diagnosis
(Stromberg Model U-1)

The jet specification diagnosis for Stromberg Model U carburetor used on Erskine Model 52 1928-29 is the same as that for Model U Stromberg used on Studebaker and will be found in the Stromberg Section in the back of the book.

Specification Table.—The following specification table contains the carburetor specifications for Stromberg Model U-1 used on Erskine.

Erskine 52, 1928-29
(Stromberg U-1 Engine 2¾" x 4½")

Description	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54-#70
Main Metering Jet	.049"	.....
By-Pass Jet	.025"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#60
Pump Reducer	.....	#65
Venturi Tube	.....	27/32"

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #70 wire drill size.

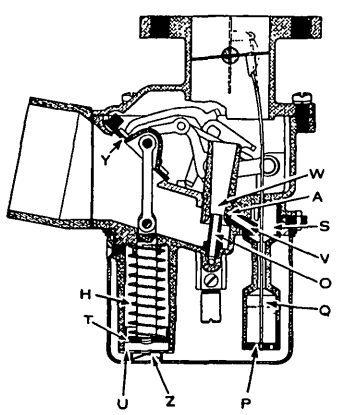
SCHEBLER CARBURETORS

Two types of Schebler carburetors have been used on Erskine automobiles in 1928, 1929 and 1930. Model 52 1928-29 used Schebler Model U-1 and Model 53 1930 used Schebler TX5-1¼".

The Model U is an air valve carburetor having two air inlets. The auxiliary air valve is closed for idling and wide open for full power. It is held in closed position by a spring and will not open until the suction in the body of the carburetor is great enough to compress the spring.

The fixed air opening is through the venturi past the main discharge nozzle. As it passes the nozzle, it picks up the proper amount of fuel and automizes it delivering it to the motor past the throttle disc. As the air valve opens, the air passing this valve mixes with the mixture delivered from

Fig. 14



Cross section view of Model U Schebler carburetor showing (H) air valve spring; (O) main gasoline nozzle; (P) accelerating pump piston; (Q) accelerating pump assembly; (T) air valve piston; (U) dash pot release valve; (V) cross passage to venturi; (V 1) cross passage metering hole; (W) venturi; (Y) air valve; (Z) dash pot cylinder release valve spring. Note that the needle valve seat is screwed into the carburetor body and held into position by a small lock screw.

the venturi and passes on into the motor. The fixed air opening through the venturi has two important parts to play. When the air valve is clamped down in the starting position and the needle valve raised to the starting position, a very rich mixture is delivered from the venturi which produces a very good starting condition. When the carburetor is operating normally, the fixed air opening through the venturi creates a high air velocity past the nozzle and the fuel delivered out of the nozzle is torn up and atomized very well so that good load speed operation is obtained.

The Model T Schebler carburetor is of the plain tube type in which a single fixed size venturi is used. Normally all the air except that which passes through the idle air bleed and idle system passes through this fixed venturi. All the metered fuel except the idle fuel and warming up and starting fuels passes through a nozzle whose tip extends into the throat of the venturi and the fuel mixes at the throat of the venturi with the air passing through. There are no moving parts controlling the normal metering of the fuel except a throttle operated metering jet which only changes a fuel feel opening from one size to a larger size when the throttle is opened.

In the Schebler section in the back of this book will be found complete information describing the operations of both the Schebler Model U and Schebler T carburetors together with cross section illustrations.

Carburetor Specifications

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
ERSKINE					STROMBERG
1927	51	Own	6	2 5/8"x4 1/2"	OE-1
1928	52	Own 8F	6	2 3/4"x4 1/2"	T-1
1929	52	Own 9F	6	2 3/4"x4 1/2"	T-1
1928-29	52	Own	6	2 3/4"x4 1/2"	W-1
					SCHEBLER
1928	52	Own 8F	6	2 3/4"x4 1/2"	U-1
1929	52	Own 9F	6	2 3/4"x4 1/2"	U-1
1930	53	Own	6	3 1/4"x4 1/2"	TX-5 1 1/4"

ADJUSTMENT PRECAUTIONS

Manifold Effect on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making adjustments on Schebler Model U carburetors. Take for example, an adjustment from a rich to a lean mixture. A tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. This is especially true of the idle and range adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the point where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation, adds nothing to the performance of the car and lowers the gasoline mileage.

Affect of Leaky Bowl on Adjustment (Schebler Model U).—On all Model U Schebler carburetors, a correct adjustment cannot be obtained unless the gasoline bowl is absolutely tight against the body flange. If the body has been removed for any reason, a new bowl gasket should be used and checked for leaks.

STROMBERG OE-1 and T-1

The adjustment information for Stromberg Models OE-1 and T-1 is practically the same. The carburetors are exactly the same with the exception of the float bowl assembly design and the high speed air bleed, but all specifications as to principle of operation is the same.

The difference between the air bleed arrangement on the two types of carburetors is that on the O type the high speed air bleed is drilled in the economizer needle while on the T type the economizer needle is blank and the air bleed is made in the carburetor body as shown in Fig. 16.

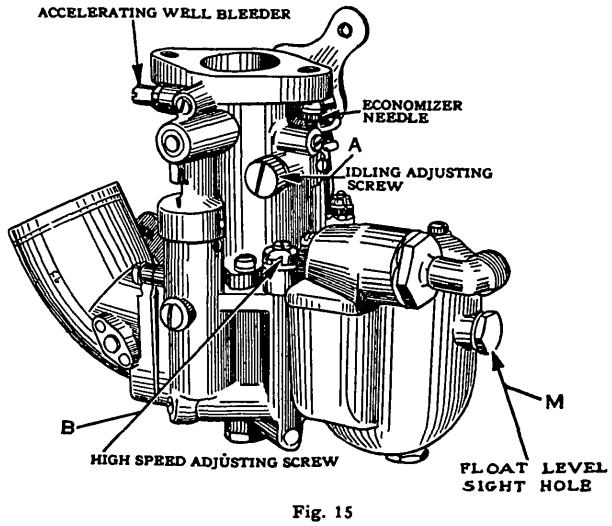


Fig. 15

View of Stromberg Model T-1 carburetor as used on Erskine automobiles. For complete adjustment information refer first to the information under Timing Precautions in this section and then turn to the Stromberg Carburetor section in the back of the book.

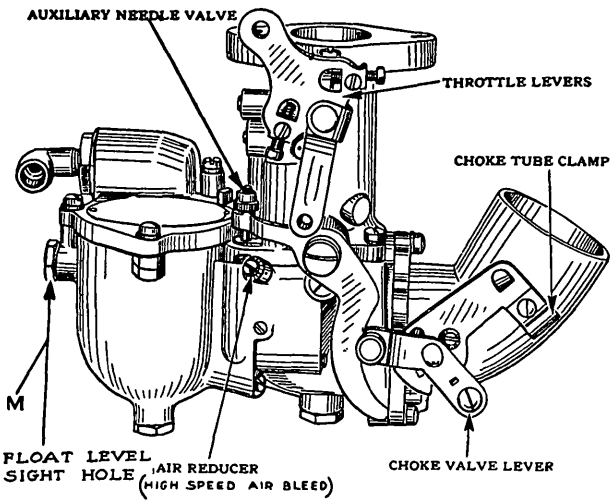


Fig 16

View of Stromberg T-1 carburetor used on Erskine automobiles showing the position of the high speed air bleeder, auxiliary needle valve for starting and action of the choke valve cam.

Carburetor Adjustment

(Stromberg Models OE-1 and T-1)

Stromberg OE-1.—The adjustment information for Stromberg Model OE carburetors is the same as that for Stromberg Model O. Complete adjustment information will be found under Stromberg Model O in the Stromberg carburetor section at the back of this book.

Stromberg T-1.—Complete carburetor adjustment information for Stromberg Model T-1 carburetors will be found under the heading Stromberg Model T in the Stromberg carburetor section in the back of this book.

SCHEBLER MODEL U-1"

If trouble is experienced with Schebler Model U carburetors, check to see that the power adjustment is set according to factory setting and then check economy and idle adjustment carefully. Inspect for bowl leaks—bowl must have air tight fit to body. See that idle tube is in place and not rubbing the needle valve lift lever. Inspect to see that the throttle shaft works freely and that throttle disc closes correctly.

Carburetor Adjustment.—Complete carburetor adjustment information for Schebler Model U carburetors will be found in the Schebler section in the back of this book.

SCHEBLER MODEL TX5–1¼"

Schebler Model T carburetors used on Erskine automobiles is of the plain tube type in which the openings and gasoline jets are fixed in size—gasoline being automatically and accurately measured by the air flow.

The metering orifice is calibrated at the factory to supply the proper amount of fuel at high and intermediate speeds, so that no manual adjustment for these speeds is necessary. The only adjustments provided on this carburetor are the idling or low speed adjustment (A) Fig. 17 and a concealed economizer adjustment (E) Fig. 18.

Idle Adjustment.—To secure the proper idling or low speed adjustment proceed as follows: After the engine is thoroughly warmed up to normal operating temperature, set the hand throttle lever on the steering wheel so that the engine is running at a medium, steady idling speed. Then gradually turn the low speed adjustment (A) Fig. 17 right or left until the steadiest or fastest running for that throttle position is obtained. This adjustment controls an air passage in such a manner that screwing it in gives a richer mixture and screwing it out gives a leaner mixture. When this adjustment is correct, the needle should be off the seat 1½ turns. The idle adjustment should be adjusted on the lean side for best economy.

If after the adjustment is made and the throttle lever is retarded, the engine idles too fast—turn the small throttle stop screw counter-clockwise to reduce the minimum throttle opening until the desired idling speed is reached. If the engine idles too slow as evidenced by its rolling and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed. When the engine is idling properly, there should be a steady hiss in the carburetor.

Economizer Adjustment.—The concealed economizer adjustment is located at the right (engine side) of the low speed or idling jet in the carburetor float chamber and is adjacent to the venturi tube as shown at (E) Fig. 18. This adjustment is of the conventional needle valve type which governs the fuel flow through a given orifice. The needle valve is equipped with a notch or serrated head and the

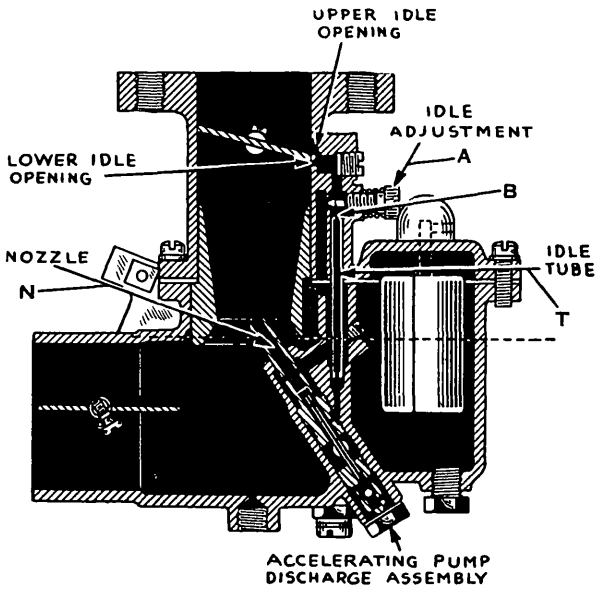


Fig. 17

Cross sectional view of Schebler Model TX5-1¼" carburetor used on Erskine automobiles. This is a plain tube carburetor having two idling openings, one above and one below the throttle and the main discharge nozzle projecting into the carburetor throat as shown at (N).

number of notches or serrations the needle valve is away from the seat is stamped on the front of the carburetor manifold flange. For example, assume that the needle valve is backed off 12 notches from the seating position, then the flange will be stamped 12. The number of notches it is necessary to set the needle valve away from the seat to secure a standard adjustment is determined at the factory by accurate and sensitive flow-meters. This number is stamped on the flange in order that the original adjustment may readily be made without the necessity of special equipment and with a minimum of time.

This needle valve adjustment is concealed by the top half of the carburetor but may be reached with a small offset screwdriver after the brass plug located directly over it has been removed. Unless the number of notches the needle valve is away from the seat has been definitely determined in advance, this method is not to be used. For most purposes it will be found advisable to remove the carburetor from the manifold and remove the carburetor upper half. This will expose to visual examination the relative location of the needle valve to the seat and with the aid of a small screw-driver the notch at which the needle valve seats may be determined without damage to the valve.

Caution: Do not force this valve into the seat.

After this has been determined, back off the number of notches stamped on the carburetor flange for the original factory adjustment. Only in the following special cases will it be advisable to alter this original setting.

Prior to the new Erskine Six engine No. E-6786 the standard adjustment of this needle valve was set in such a manner as to secure maximum economy and maximum performance after the engine was thoroughly warmed up. To eliminate a flat spot noticeable in some localities with certain grades of gasoline during the warming up period when accelerating at speeds of from 10 to 15 miles per hour, the standard adjustment was changed to six notches richer.

This change became effective with the above engine number and slightly affects fuel economy. If an owner prefers economy and does not object to a slight flat spot during the first few miles of driving at low road speed, the economizer adjustment on the later cars (after engine No. E-6786) can be closed six notches which brings it back to the original setting.

Opening the economizer adjustment more than the factory setting after the above engine number to secure greater acceleration, should not be done except when the owner demands performance during the warming up period. Even then he should be advised that this of necessity must be done at the expense of a slight increase in fuel consumption. As previously stated, this adjustment will require little or no attention in the vast majority of cases.

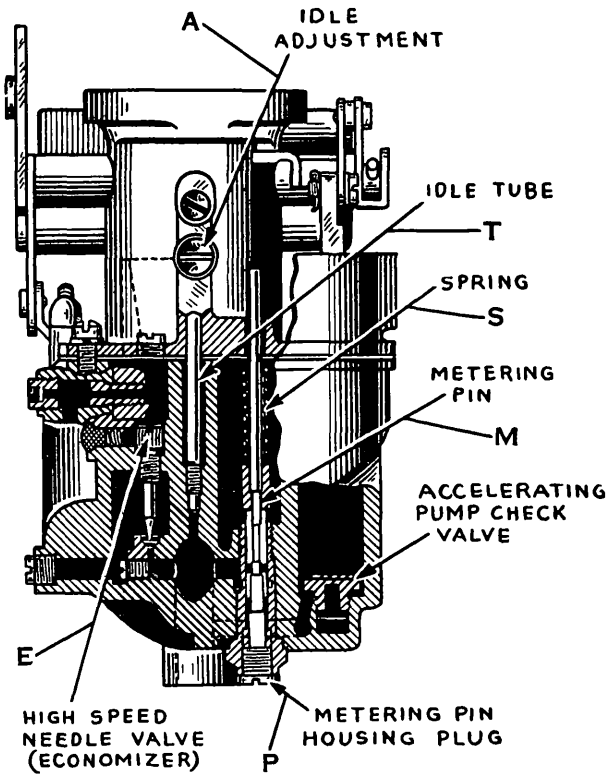


Fig. 18

Cross sectional end view of Schebler Model TX5-1¼" carburetor used on Erskine automobiles showing the concealed high speed needle valve or economizer valve (E). The main metering needle is shown at (M).

To check the fuel level, the upper half of the carburetor body must be removed. Turn the upper half upside down (this places the float in the shut off position) and measure with a scale the distance from the surface of the body to the top of the float. This measurement should be 1¾". After the carburetor is reassembled remove the drain plug from the bottom of the carburetor bowl and insert a small instrument which will contact with the float to make sure it is free to operate.

In cases of flooding it is well to remove the drain plug and allow the carburetor bowl to drain; this will permit the float to drop to its lowest position and completely open the float needle valve. The first few pulsations of the fuel pump will force the gasoline through the float valve and force any dirt that may have collected on this seat on to the carburetor.

Ford 1928-30

Motor Tune-Up

When tuning a Ford Model A motor, special care should be exercised when checking the ignition timing and carburetor adjustment.

Three different jet assemblies and two venturi assemblies have been used on Ford Model A automobiles from 1928 to 1930 inclusive. On the early models, a large and small venturi was used with one combination of jets. The first change included a single venturi and a change in jet sizes. The last change used on the 1930 models includes another change in jet specifications. This information will be found in the Carburetor Specification section.

If trouble is experienced in obtaining a correct carburetor adjustment, check the idle jet for correct size and make sure that both the dash and idle adjustments have been correctly made (see Carburetor Adjustment section).

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check the ignition timing; adjust if necessary.
3. Clean gas line strainers and screens; also check gas lines for loose fittings.
4. Check fan and generator belts; adjust if necessary.
5. Tighten water pump nuts; this operation is only necessary when packing gland is leaking.
6. Adjust carburetor; clean if necessary.
7. Check and tighten all electrical connections.
8. Road test car.

Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load condition.

Ragged Idle

Spark Plug Point Gap Setting.—A poor idling condition may be caused by the spark plug points being set too close together. Whenever this condition is encountered, always check the spark plug gap first and set at .035".

Idle Jets.—A poor idling condition may be caused by an idling jet (D) Fig. 5 that is too large. The standard idling jet size for Ford Model A carburetors is No. 11; however, it may be that this jet has been drilled out or tampered with.

To check, remove the lower carburetor bowl and carefully check the size of the idling jet with a No. 11 wire drill. If the jet is found to be too large, replace with a new part.

Manifold Leak.—A condition of ragged idle may be caused by air leaks around the manifold flanges. To check for this condition, obtain a squirt can full of light cylinder oil. If a change in motor performance is noted when gasoline is squirted over the manifold flange gasket, tighten the manifold flange nut. If this does not correct the trouble, replace the manifold gasket.

Poor Acceleration

Poor acceleration may be caused either by an improper carburetor adjustment or plugged up or dirty carburetor jets. Whenever this condition is encountered, the carburetor should be removed from the car and thoroughly cleaned. For complete information on carburetor adjustment, see Adjustment section.

Low Gasoline Mileage

Carburetor Dash Adjustment.—One of the most common causes of low gasoline mileage is the improper adjustment of the dash control. On early model cars the dash adjustment needle seat (H) Fig. 6 was a separate part screwed into the carburetor body. When the needle was carelessly screwed too tightly into this seat, it sometimes happened that when the needle valve was opened, the seat would screw out with the needle, thus causing a gasoline leak around this seat, which would lower the gasoline mileage.

The dash control needle supplies additional gasoline to the main discharge jet, therefore, for most economical driving this needle should be properly adjusted. Ordinarily, the needle should never be screwed out more than one fourth turn and for country driving, the needle should be completely closed. For city driving, one fourth turn open is permissible.

IGNITION TIMING

Ford Model A 1928-30.—To time the spark to the motor, remove the timing pin (A) Fig. 1 from the timing case cover and insert the small end of the pin in the hole from which it was removed. Crank the motor and at the same time exert a slight pressure on the outer end of the timing pin until the pin drops into the recess in the camshaft gear. When the pin drops into the recess it will indicate that No. 1 piston is at T.D.C. of the compression stroke or at the firing point. Place the hand spark control in the full retard position. Locate the distributor so that the points just break contact and the rotor is at the terminal of the wire leading to the No. 1 spark plug.

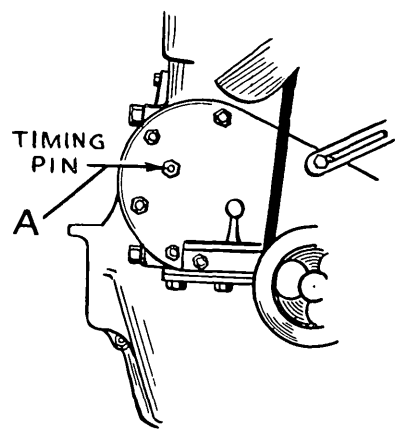


Fig. 1

Cross sectional view of a Ford Model A motor showing the location of the ignition timing pin. When timing the motor, this pin should be removed and the outer end inserted through the hole in the timing gear case. When piston No. 1 is at top dead center of compression stroke, the timing pin can be felt to enter a depression in the timing gear.

The breaker contacts should be set at .020" and the spark plug gaps at from .027" to .035" depending upon operating conditions.

VALVE TIMING

Ford Model A 1928-30.—To check the valve timing, first remove the valve cover plates and the spark plug from No. 1 cylinder. Check the tappet clearance of No. 1 exhaust valve and make sure that it is within the tolerance of .010" to .013". With a tool inserted in the spark plug hole of No. 1 cylinder crank the motor until No. 1 piston is just past T. D. C. of the exhaust stroke (4 degrees) at which point the exhaust valve should just close.

GAS LINE SCREENS

On all Model A Fords 1928-30, gasoline is supplied to the carburetor by gravity feed. There are three strainer screens provided for filtering the fuel. One screen is located in the filler opening of the main supply tank; another is located in the sediment bowl which is between the supply tank and the carburetor. The third screen is located in the carburetor. These strainer screens should be removed at reasonable intervals, thoroughly washed in gasoline and blown clear with compressed air.

Carburetor Specifications

FLOAT LEVEL

Ford Zenith Carburetor.—To determine the correct float level remove the carburetor from the car and remove the lower half of the body. With the upper half held in an inverted position the float should be parallel to the casting.

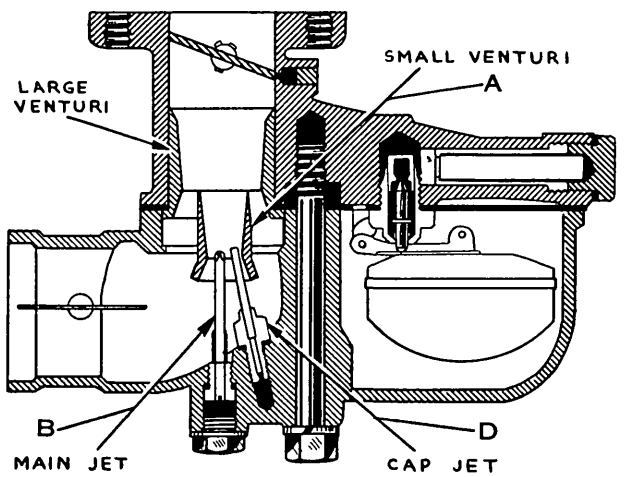


Fig. 2

Cross section view of early Model A Ford carburetor showing double venturi arrangement.

CARBURETOR SPECIFICATION DIAGNOSIS

The early Ford Model A automobiles came equipped with carburetors having double venturis made up in two pieces as shown in Fig. 2.

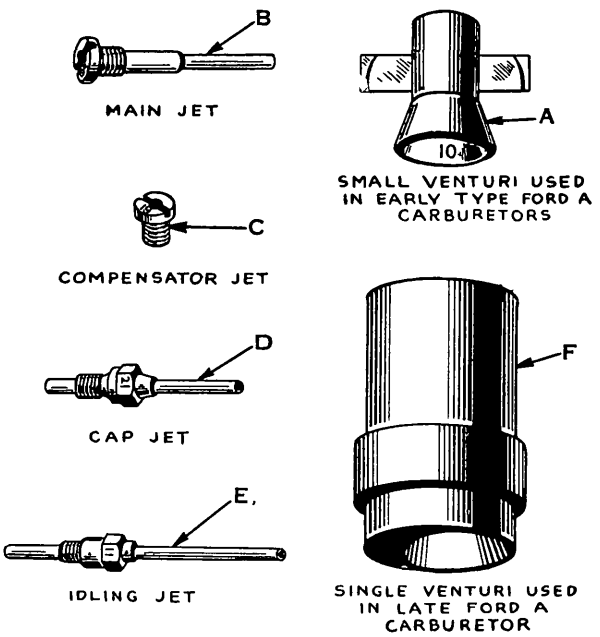


Fig 3

Showing jet assembly used on 1928-29 Ford Model A carburetor and small venturi (A) used on early models. The single venturi (F) is used on Ford 1930 automobiles.

The jets used in all Model A Ford carburetors are as follows: Main jet (B) Fig. 3; compensator jet (C); cap jet (D) and idling jet (E). In the early model carburetors the main jet (B) was stamped 20. The compensator jet (C) was stamped 18; the cap jet (D) was stamped 19 and the idling jet (E) was stamped 10. These numbers stamped on the jets indicate the size of the jets in wire drill dimensions.

Two changes have been made in Ford Model A carburetors to date. The first change included the replacing of the double venturi by a longer single venturi, the narrowest part of which is 27/32" in diameter as shown at (F) Fig. 3. In addition, a secondary well (G) Fig. 4 was added. This well is screwed into the lower half of the carburetor as shown in the illustration and forms the well from which the idling jet derives its supply. A slight change was also made in the angle of the throttle plate and the plate was stamped No. 18½ instead of No. 20 as in the early models. The location of the cap jet in the lower half of the carburetor was also slightly changed.

The above changes necessitated using a different combination of fuel orifices so the jet specifications were changed and the parts were stamped as follows: The main metering jet originally stamped No. 20, changed to 19.5. The compensator jet

originally stamped No. 18 changed to No. 19. The cap jet originally stamped No. 19 changed to No. 21. The idle jet originally stamped No. 10 changed to No. 11.

The new idling jet in this first change was slightly shorter than the original jet used, the new jet being 3" over all and the old jet being 3 5/64" over all.

Never attempt to use old style parts in present design carburetors. While the parts look something alike, the fuel orifices in the new parts have been changed to secure maximum results.

The second or last change in Ford carburetor parts went into effect on the 1930 Model A Fords. The changes were made in the jets as shown in Fig. 5. These jets are the only Model A carburetor jets supplied by the Ford factory and they can be satisfactorily used for service replacement of corresponding parts in carburetors used in 1928 and 1929 as well as the 1930 jobs.

The size of the new jets are as follows: Main jet No. 20; compensator jet No. 19; cap jet No. 20 and idling jet No. 11. It is true there is a slight difference in the size of the openings in the present jets as compared with some of the jets used in previous Model A carburetors. This, however, in no way affects their interchangeability or impairs satisfactory operation.

Under no circumstances must an old style carburetor bowl A-9512-A which can be distinguished by small dowel pins which enter the slots in the double venturi be assembled to a new style upper body assembly A-9520 as the carburetor will not function properly if these parts are assembled in this manner. If it should become necessary to change an old style bowl it can be replaced with the type now used by changing from the double to the single venturi. As previously stated, the jets in the present design carburetors are interchangeable with the old type jets but never, under any consideration, attempt to use old style jets in the new style carburetors.

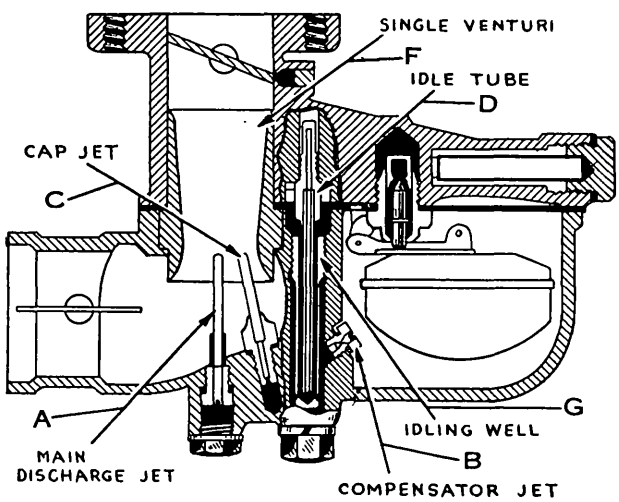


Fig. 4

Cross section view of Ford Model A carburetor showing single venturi arrangement and idle tube assembly. The idling tube (D) gets its supply of gasoline from the idling well (G).

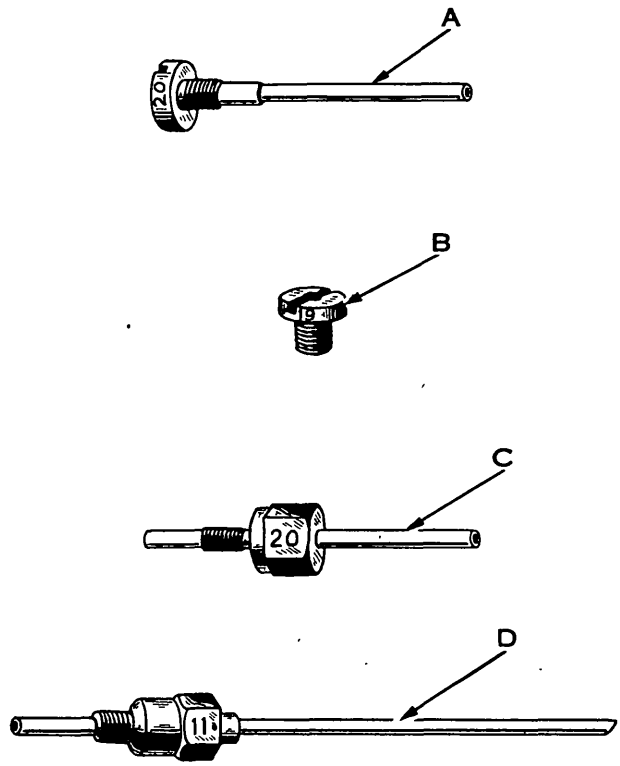


Fig. 5

Showing jet assembly used in the late 1930 Model A Ford carburetor.

Carburetor Adjustment

There are only two adjustments on a Ford Model A carburetor, namely, the idle speed adjustment and the dash control adjustment. One of the most common causes of low gasoline mileage is the improper adjustment of the dash control. Read carefully the following instructions under the heading of Dash Control Adjustment.

Idle Adjustment.—To set the carburetor after it has been removed or dismantled for any reason, proceed as follows. Open the idle adjustment approximately from 3 to 3½ turns. Open the dash control adjustment one half turn. Start the motor. After the motor has thoroughly warmed up, turn the dash control down until it is only one fourth of a turn open. Adjust the throttle plate adjusting screw (B) Fig. 6 to a point where the engine will run fast enough to keep from stalling. Next turn the idle adjusting screw (B) in until the motor begins to Roll or surge then open up the adjustment until the motor just smooths out. Usually the best idling will be obtained with the adjusting screw approximately two turns off its seat.

If after the idle adjustment is completed the motor idles too fast, then readjust the throttle plate adjusting screw (A) until the motor idles at the desired speed.

Dash Control Adjustment.—The dash adjustment does not control the entire fuel supply. A minimum amount of fuel is constantly drawn from the float chamber through small fixed openings even when the dash adjustment is fully closed. On early model cars the dash adjustment needle seat (H) Fig. 6 was a separate part screwed into the carburetor body. When the needle is carelessly screwed too tightly into this seat it sometimes happens that when the needle valve is opened the seat will screw out with the needle thus causing a gasoline leak around the seat, which lowers the gasoline mileage. On early model carburetors with removable dash control needle seats extreme care should be exercised when making a dash adjustment. On late model carburetors, the dash control needle seat is made integral with the carburetor body.

For best operation under usual driving conditions, the dash adjustment should be backed one quarter turn off its seat. Running with the adjustment more than one quarter turn off its seat, may be necessary on new, stiff engines but otherwise this will result in poor gasoline economy, carbon and crankcase dilution.

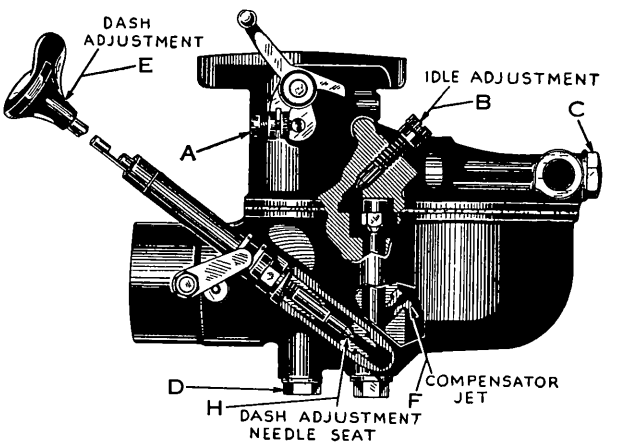


Fig. 6

Cutaway sectional view of a Ford Model A carburetor showing the dash and idle adjustments. On early model carburetors, the dash control needle seat (H) was a separate part screwed into the carburetor body while on late model carburetors the needle seat is made in the carburetor body and cannot be removed.

The dash adjustment may be turned less than one quarter turn off its seat to obtain a lean mixture suitable for high altitudes, high test fuels or when driving at steady speed on level road. Under normal conditions or city driving, however, too lean a mixture causes uneven running at low speeds and slow pick up.

Do not force the adjusting needle down on its seat as this will score the part.

Franklin 1925-30

Motor Tune-Up

When tuning a Franklin motor special attention should be given to the chain adjustment and ignition timing. The chain adjustment is controlled by the generator mounting and the chain should have from ½" to ⅝" up and down play.

When adjusting the carburetors, care should be exercised to see that the motor is up to running temperature. If this precaution is not taken and a carburetor adjustment is made with a cold motor the carburetor will run rich after the motor is warmed up to running temperature.

All special information following the motor tune-up operations should be closely observed.

Tune-Up Operations

1. Remove cylinder air hood; remove walking beam covers and pads.
   Note: On all models equipped with vacuum tank fuel feed the air duct should be removed from the opposite side of the vacuum tank mounting, otherwise there is danger of damaging the fuel system.
2. Tighten cylinder hold down nuts; valve lifter tube yoke nuts; walking beam cage cap screws and manifold bolts.
   Note: Care should be exercised when tightening valve lifter tube yoke nuts not to crack the crankcase. The lifter tube yoke studs are screwed from the bottom up making it necessary to remove the oil reservoir if one is broken.
3. Clean and adjust distributor and spark plug points.
   Note: The spark plugs should be removed from the motor when checking ignition and valve timing.
4. Check timing chain for slack; adjust if necessary.
   Note: All models of Franklin are provided with an inspection hole in front of the generator for timing chain adjustment. (See Timing Chain Adjustment for more complete information).
5. Check the ignition timing; adjust if necessary.
   Note: Spark plugs should be removed during timing operation. All models of Franklin are equipped with automatic spark advance. Make sure that governor springs are not weak or broken.
6. Adjust valve tappets and free up valves.
   Note: Best results will be obtained if valve tappet clearance is set with a cold motor.
7. Clean gas line strainers and screens; also check gas lines for loose fittings.
8. Check generator charging rate; adjust if necessary.
   Note: For average driving conditions, the output of the generator should be set so that at maximum generator output the ammeter needle stands at zero with all lights turned on.
9. Adjust carburetor; clean if necessary.
10. Road test car.
    N te: The ignition should never be advanced beyond a point where a spark knock occurs except under full load condition.

Ragged Idle

Faulty Valve Adjustment.—A poor idling condition on Franklin automobiles may be caused by improper valve tappet adjustment, leaky valve stem guides, loose intake manifold studs and leaking intake valves.

Spark Plug Gap.—A poor idling condition on Franklin automobiles may be caused by improper setting of the spark plug gaps. On late model cars the spark plug gap setting is especially critical and should not exceed .025". On early model motors the spark plug clearance should not exceed .031".

Carburetor.—If all other units such as ignition, spark plug points, etc., have been checked and a poor idling condition still persists, make sure that the idling discharge jets in the carburetor are clean.

Loose Carburetor Butterfly Valve.—A condition of poor idle may be caused by the butterfly valve set screws working loose under vibration and heat action thus allowing the butterfly valve to shift its position slightly and upset the mixture balance at low speeds. To correct, remove the carburetor from the car and tighten up the butterfly valve screws.

Poor Acceleration

Timing Chain Jumped.—A condition of poor acceleration may be caused by incorrect timing as the result of the timing chain jumping a sprocket tooth. In cases where the timing chain has jumped, the symptoms will be similar to late ignition or retarded spark. The timing chain adjustment operation is important and should be done with care. Turn to Timing Chain Adjustment for more complete information.

Water in Gasoline.—A condition of poor acceleration may be caused by water collecting in the carburetor bowl and interfering with the passage of gasoline through the carburetor jets.

Loose Main Carburetor Jets.—A condition of poor acceleration may be caused by the main jet in the carburetor working loose. To correct this condition, remove the carburetor from the car and tighten the main jet with a screwdriver.

Faulty Governor Springs.—A condition of poor acceleration may be caused by weak or broken ignition governor springs. To correct this condition, remove the distributor head and replace the governor springs.

Faulty High Tension Wiring.—On late model Franklin cars with ignition coil mounted under the dash, poor acceleration may be caused by faulty insulation on the secondary wire leading from the ignition coil to the head of the distributor. This wire follows along the side of the frame. The symptoms are very similar to a weak ignition coil or condenser. To check out this condition, install a temporary high tension lead from the coil to the distributor head. If this corrects the trouble, then

the original insulation should be replaced with a new wire which should be installed as follows: Drill a half inch hole through the metal dash as near the motor as possible. Secure a piece of loom long enough to reach from the coil terminal to the distributor head. Next, thread the high tension wire through the loom and install this assembly through the hole in the dash connecting one end to the coil and the other end to the distributor head.

Motor Misfiring

High Tension Wiring.—Motor misfiring may be caused by a breaking down of the high tension insulation on the wire leading from the distributor head to the spark plugs. Due to the fact that the high tension wires are threaded through a metal conduit it is extremely important that the high tension insulation is in good condition and is not weakened or cracked from the corrosive action of oil and heat.

Cracked Spring Plug Water Shield.—A misfiring of the motor may be caused by a cracked spark plug water shield or by an accumulation of oil and dirt on the inside of the shield.

Lack of Power

Lack of power may be caused by a condition of improper timing due to a jumping of the timing chain. (See Timing Chain Jumps under Poor Acceleration).

Lack of Speed

A lack of speed may be caused by a dirty carburetor or an improper carburetor setting. For more complete information see Carburetor Adjustment.

Motor Noises

Loose Valve Walking Beam Tube.—A distinct rapping noise in time with the valve action may be caused by a working loose of the top support nuts of the walking beam tube. This allows the walking beam tube to shift off center, thus allowing the push rod to bind in the walking beam tube bushing. This condition can be easily detected by placing the hand on the walking beam tube.

OIL PRESSURE

The following oil pressures are for running temperature.

Model and Year	Min.	Max.
10 C—1925	35 lbs. at 17	M.P.H.
11 A—1925-26	35 lbs. at 17	M.P.H.
11 B—1927	35 lbs. at 17	M.P.H.
12 A—1928	35 lbs. at 17	M.P.H.
12 B—1928	35 lbs. at 17	M.P H.
130—1929	35 lbs. at 17	M.P.H.
135—1929	35 lbs. at 17	M.P.H.
137—1929	35 lbs. at 17	M.P.H.

The following pressures are with the oil at room temperature.

145—1930	35 lbs. at 32	M.P.H.
147—1930	35 lbs. at 32	M.P.H.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing data for Franklin automobiles from 1925 to 1930.

Year	Model	TAPPET ADJUSTMENT For Timing Int.	TAPPET ADJUSTMENT For Timing Exh.	TAPPET ADJUSTMENT Running Int.	TAPPET ADJUSTMENT Running Exh.	VALVE TIMING Fly-wheel Travel	VALVE TIMING Int. Valve	VALVE TIMING Exh. Valve
FRANKLIN								
1925	10C	031″		010″	010″	*T D C	Opens	.
1926	11A	031″		010″	010″	*T D C	Opens	
1927	11B	031″		010″	010″	*T D C	Opens	
1928	12A-12B	031″	.	010″	010″	*T D C	Opens	.
1929	130	031″		012″	012″	*T D C	Opens	
1929	135-137	031″		012″	012″	*T D C	Opens	.
1930	145-147	036″		008″	008″	⅞″ to 1¾″A	Opens	.

T D C—Top dead center
A—After top dead center
*Valve timing is correct when timing mark on fan rim is within the tolerance of ¼″ before ¾″ after the indicator mark on the fan housing

Franklin all Models 1925-30.—Ignition timing procedure is the same on all models of Franklin. The contact point clearance and flywheel position in the following timing procedure are given for 1930 models. (For other models see Ignition Timing table).

A dead center mark for pistons Nos. 1 and 6 is provided on the clutch and a triangular mark on the fan wheel for the purpose of locating the exact firing position.

With the breaker point gap set at .020″ clearance and the spark control in fully retarded position the spark should occur in No. 1 cylinder when No. 1 piston, entering power stroke, is ⅞″ before top dead center flywheel travel. The mark I-6 on the clutch will be the same distance before top dead center and the triangular mark on the fan wheel should be to the right or before the indicator line on the fan wheel housing.

To determine accurately the instant at which the spark occurs, remove the center wire from the distributor cap with cap in running position. Hold the metal terminal on the wire from 1/16″ to ⅛″ away from any metal part of the motor. A spark will occur at this gap the instant the contact points separate when the distributor is advanced and then retarded.

VALVE TIMING

Valve Clearance.—The special valve tappet adjustments for timing as given in the valve timing table are very important in order that valve action may be completed at the proper time.

Valve tappet clearance should be adjusted when the motor is cold. The following procedure for adjusting the running clearance of the valve tappets, should be closely observed in order that the proper adjustments may be obtained.

Adjust both valves for No. 1 cylinder when No. 6 exhaust valve is just closed.

Adjust both valves for No. 4 cylinder when No. 3 exhaust valve is just closed.

Adjust both valves for No. 2 cylinder when No. 5 exhaust valve is just closed.

Adjust both valves for No. 6 cylinder when No. 1 exhaust valve is just closed.

Adjust both valves for No. 3 cylinder when No. 4 exhaust valve is just closed.

Adjust both valves for No. 5 cylinder when No. 2 exhaust valve is just closed.

Valve Timing Table

The following table contains valve timing data for all models of Franklin from 1925 to 1930 inclusive. All tappet adjustment settings are given for cold motors unless otherwise designated.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con Pt. Clear	Fly-wheel Travel	Spark Lever Position		
FRANKLIN						
1925	10C	015″	*1″ B	Adv	031″	1-4-2-6-3-5
1926	11A	015″	* ¾″ B	Adv	031″	1-4-2-6-3-5
1927	11B	015″	*1″ B	Adv	.031″	1-4-2-6-3-5
1928	12A-12B	020″	*1″ B	Adv	025″	1-4-2-6-3-5
1929	130	020″	*1 ⅝″ B	Adv	025″	1-4-2-6-3-5
1929	135-137	020″	*1 ⅝″ B	Adv	025″	1-4-2-6-3-5
1930	145-147	020″	* ⅞″ B	Adv	025″	1-4-2-6-3-5

Adv —Spark control advanced
B —Before top dead center
*The fan rim is provided with a triangle mark which indicates T D C of pistons Nos 1 and 6, when in register with the indicator mark on the fan housing

Franklin all Models 1925-29.—To check the valve timing, crank the motor until No. 1 piston is at top dead center, compression stroke, and adjust the intake valve tappet for No. 1 cylinder to .031″ clearance. Continue to crank the motor nearly one revolution until the .031″ clearance between valve stem and rocker arm is just taken up. Use a piece of tissue paper between valve stem and walking beam to determine this position. At this point the triangular mark on the fan rim should be from ¾″ before to ¼″ past the indicator mark on the fan housing. When the triangular mark on the fan rim registers with the indicator mark on the fan housing the piston is at dead center position.

Reset valve tappet clearance after timing operation is completed. (See Valve Timing Table for correct running clearance).

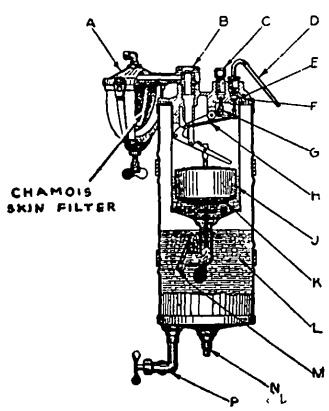


Fig 1

Cross section view of vacuum tank used on Franklin automobiles showing chamois skin filter. This filter should be removed and thoroughly cleaned at least once a year.

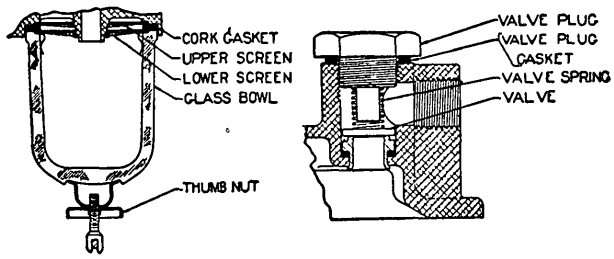


Fig 2

Cross section view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of the cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when plug is replaced.

Franklin Models 145, 147 1930.—To check the valve timing, crank the motor until No. 1 piston is at top dead center, compression stroke, and adjust the intake valve tappet for No. 1 cylinder to .036″ clearance. Insert a .005″ feeler gauge in the tappet and continue to crank the motor nearly one revolution until the same tension is secured on the .005″ feeler as was previously secured on the .036″ gauge. At this point the triangular mark on the fan rim should be from ⅞″ to 1¾″ past the indicator mark on the fan housing.

After timing operation is completed reset valve tappets to correct running clearance according to Valve Timing table.

CHAIN ADJUSTMENT

Franklin all Models 1925-30.—Timing chain adjustment is provided for through the generator mounting and can be checked through the chain inspection plug hole in the side of the timing case. To adjust the chain loosen the generator support bracket nuts at the top and bottom and the lock nut of the adjusting screw. Turn the adjusting screw and swing the generator away from the engine until the chain has ⅜″ to ½″ up and down play as indicated by a hooked wire inserted in the inspection hole.

GAS LINE SCREENS

All Franklin automobiles equipped with vacuum tank fuel feed have two filters in the fuel line. One, in the form of a chamois skin, is located in the gascolator, Fig. 1, which was between the main supply tank and the vacuum tank. This chamois should be removed and cleaned or replaced at least once a year. The other strainer screen located in the carburetor should likewise be removed and cleaned at frequent intervals.

Franklin models equipped with fuel pump feed have two strainer screens in the gasoline line. One in the top of the glass bowl at the fuel pump, Fig. 2; the other in the carburetor. These screens should be removed frequently and thoroughly washed in gasoline and blown clear with compressed air.

Carburetor Specifications

FLOAT LEVEL

With the present day demand for power, performance and gasoline mileage, carburetor adjustments have become an important factor in motor tune-up operations. It has been found that in some cases float level adjustments materially affect motor operations.

When Stromberg carburetors are shipped from the Chicago factory, they are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When higher test (lower specific gravity) 68° to 70° Baumé fuel is used the float level rises and by bending the float arm the gasoline level is brought back to normal. On page 70 will be found a table of float levels for low test and high test fuels for Stromberg carburetors (see Affect of Fuel on Float Level, page 70).

Stromberg Model OE-1.—The proper gasoline level is 1″ below the top of the float chamber casting which is the same as 2″ measured on the float stem as shown in Fig. 3. In the side of the float chamber of the later type carburetors there is a screw plug. Gasoline should stand even with the lower edge of the plug opening. To adjust the float level remove the float valve stem cap, loosen the valve stem lock nut, hold the valve stem sleeve from turning by applying a small wrench to its flat side and screw the valve stem down, clockwise, to lower the level or up to raise the level. Each full turn of the valve stem changes the gasoline level about 3/32″.

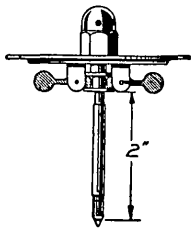


Fig. 3

Float needle valve assembly as used in Stromberg Model OE-1 for Franklin automobiles. The gasoline level in the float bowl will be correct when the bottom surface of the bushing of the float needle measures 2″ from the end of the needle as shown in the illustration.

Stromberg Model OE-2.—The Model OE-2 should maintain the same gasoline level and the level adjustment is the same as described for Model OE-1 carburetor.

Stromberg Model T-2.—To check the float level, remove the sight plug (F) Fig. 12 from the electric primer body. Gasoline should stand level with the lower edge of the sight plug hole. To raise or lower the level, remove the float cover and bend the float arm up or down as required. Bending the float arm up or down 1/16″ will change the float level the same amount and in the direction in which the arm is bent. Normally there should be 7/32″ clearance between the top of the float and the float cover without the gasket in place.

Stromberg Model U-2.—The gasoline level can be checked by removing the sight plug (F) Fig. 13 from the side of the float chamber. With the motor idling, gasoline should stand flush with the lower edge of the sight plug hole. To raise or lower the level, remove the float cover and bend the float arm up or down as required. Bending the arm up 1/16″ will raise the level the same amount and bending it down 1/16″ will lower the level the same distance. Normally there should be 7/32″ clearance between the top of the float and the float cover without the gasket in place.

Stromberg Model U-3.—To check the float level, remove the metering jet (H) Fig. 15 and insert a screw connection with a 4″ rubber tube attached. Hold the end of the tube above the float chamber and crank the motor with the starter to fill the float chamber. Lower the tube along side of the float chamber until gasoline flows from the open end of the tube. This indicates the level of the gasoline in the chamber. The level should stand 9/16″ below the top of the float chamber casting. Raising or lowering the float level may be accomplished by removing the float cover and bending the float arm up or down as required. Bending the float up or down 1/16″ will change the float level the same amount and in the direction in which the arm is bent.

CARBURETOR SPECIFICATION DIAGNOSIS

Franklin automobiles have come equipped with three types of Stromberg carburetors from 1925 to 1930 inclusive. (See Motor Specifications under Carburetor Adjustment).

The jet specification information is arranged by carburetor model rather than by car model. To find the carburetor specifications for any particular model of Franklin, first determine the model of the carburetor by either referring to the table of Motor Specifications or by examining the name plate of the carburetor. Next refer to the Carburetor Specification information given under the model heading for the carburetor. The diagnosis information is given first followed by the specification tables which contain the correct carburetor calibration specifications for each model of car using this model of carburetor.

Jet Measurements.—All Stromberg carburetor specifications are given either in wire drill sizes or thousandths of an inch. The main metering jets and economizer by-pass jets used on Stromberg U type are the only specifications that are given in thousandths of an inch; all other dimensions are wire drill sizes. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch and metric drill sizes is given below.

How to Read Stromberg Model Numbers.—The first letter of a Stromberg model designation indicates the type; the following letter indicates some special form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor. The size starting from 1″ which is No. 1 and increasing in ¼″ steps. For example, take a U type carburetor. A U-1 has a 1″ throat while a U-2 has a 1¼″ throat. The

actual diameter of the carburetor opening is 3/16" greater than the normal rated size in accordance with the standard of The Society of Automotive Engineers.

An X in the model symbol indicates that the carburetor flange bolt holes are at right angles to the line of air entrance and the float chamber.

Drill Sizes

The following table contains twist drill and steel wire gauge sizes and areas, together with nearest equivalent metric drill sizes.

Drill No	Dia In.	Area, Sq In	Nearest Metric Size MM	Dia. In	Area Sq In	Drill No	Dia In.	Area Sq. In	Nearest Metric Size MM	Dia In	Area Sq In
1	2280	04082	5 8	2298	04093	41	0960	00723	2 45	0965	00731
2	2210	03835	5 6	2205	03819	42	0935	00686	2 35	0925	00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	0866	00589
5	2055	03316	5 2	2047	03291	45	0820	00528	2 10	0827	00537
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	0807	00512
7	2010	03173	5 1	2008	03167	47	0785	00483	2 00	0787	00486
8	1990	03110	5 1	2008	03167	48	0760	00453	1 95	0768	00463
9	1960	03017	5 0	1969	03039	49	0730	00418	1 85	0728	00416
10	1935	02942	4 9	1929	02918	50	0700	00384	1 80	0709	00395
11	1910	02865	4 9	1929	02918	51	0670	00352	1 70	0689	00352
12	1890	02803	4 8	1890	02803	52	0635	00316	1 60	0630	00312
13	1850	02688	4 7	1850	02688	53	0595	00278	1 50	0591	00274
14	1820	02601	4 6	1811	02576	54	0550	00237	1 40	0551	00238
15	1800	02544	4 6	1811	02576	55	0520	00212	1 30	0512	00206
16	1770	02460	4 5	1772	02456	56	0465	00169	1 20	0472	00175
17	1730	02350	4 4	1732	02356	57	0430	00145	1 10	0433	00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	1660	02164	4 2	1654	02149	59	0410	00132	1 05	0413	00134
20	1610	02033	4 1	1614	02046	60	0400	00128	1 00	0394	00122
21	1590	01985	4 0	1575	01948	61	0390	00119	1 00	0394	00122
22	1570	01936	4 0	1575	01948	62	0380	00113	95	0374	00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	00110
24	1520	01814	3 9	1535	01851	64	0360	00101	90	0354	00098
25	1495	01755	3 8	1496	01758	65	0350	00096	90	0354	00098
26	1470	01697	3 7	1457	01667	66	0330	00085	85	0335	00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01452	3 5	1378	01491	69	0292	00067	75	0295	00068
30	1285	01296	3 3	1299	01325	70	0280	00061	70	0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0256	00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	0256	00051
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00034	55	0217	00037
36	1065	00890	2 7	1063	00887	76	0200	00031	50	0197	00030
37	1040	00849	2 6	1024	00824	77	0180	00025	45	0177	00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00013
40	0980	00754	2 5	0984	00760	80	0135	00014	35	0138	00013

STROMBERG CARBURETORS

Specification Diagnosis

Stromberg Models OE-1 and OE-2.—On the early models of Franklin Models 10C, 11A and 11B from 1925 to 1927 Stromberg Model OE carburetors were used. The 1925 and 1926 models used a 1" carburetor while the 1927 models used a 1¼" carburetor.

While the external carburetor design for all Model OE types may be slightly changed, the principle of operation and internal parts for all types are practically the same.

Idling Discharge Jets (Stromberg OE-1 and OE-2).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets too Large.—If the idling jets Fig. 4 are too large the motor will Roll and load regardless of how much air is admitted through the idle adjustment; also the motor will have a tendency to idle fast with the throttle completely closed

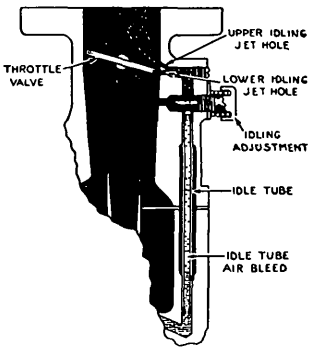


Fig. 4

Sectional view of Stromberg Model O showing how the fuel feed through the idling system is increased by passage of the throttle edge across the lower discharge opening.

High Speed Adjustment (Stromberg OE-1 and OE-2).—The high speed adjustment will take care of all ranges within the limit of performance of the carburetor. Very little trouble will be experienced with high speed adjustment from any cause other than wear.

Diagnosis, High Speed Adjustment Parts Worn.—Wearing of the high speed adjusting needle and socket will cause a variation or irregular running of the motor at speeds above 20 miles per hour. A loss in gasoline mileage may also be noticed.

To check for worn parts turn the adjustment back and forth and if a looseness can be felt the parts are worn and should be replaced. See information under adjustment in the Adjustment Section.

Accelerating Well Bleeder and Discharge Jet. (Stromberg OE-1 and OE-2).—If all carburetor adjustments have been correctly made and a noticeable flat spot still exists on quick acceleration the trouble may be due to an accelerating well bleeder or discharge jet of wrong size.

Diagnosis, Well Bleed too Large—A well bleeder (A) Fig 5 that is too large can be indicated by testing the car under quick acceleration on a level road When the throttle is first opened the car will accelerate with good power for a short distance and then suddenly hesitate and may backfire.

Diagnosis, Well Bleeder too Small.—To determine whether the accelerating well bleeder is too small, test the car under quick acceleration on a level road. In the first stages of acceleration the motor will have good

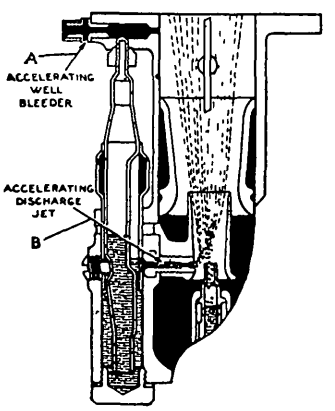


Fig. 5

Sectional view of Stromberg Model O showing accelerating well and bleeder. Note that the bleeder has two sizes of bleed holes for adjustment purposes. The small hole is for winter adjustment and the large hole is for summer adjustment.

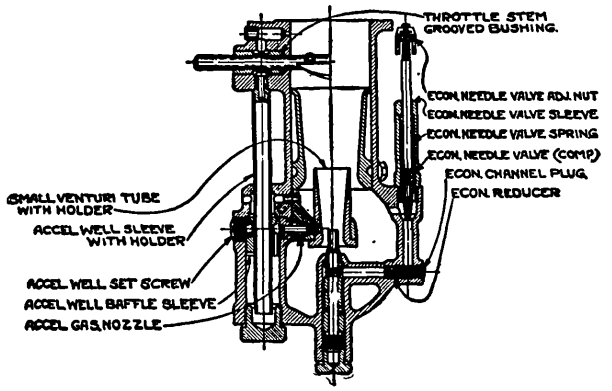


Fig. 6

Cross section view of Stromberg Model O carburetor showing economizer needle and accelerating well assembly.

power but as the car approaches the desired speed a tendency to load will be noticed.

Diagnosis, Accelerating Well Discharge Jet too Large or too Small.—If the accelerating well discharge jet (B) Fig. 5 is too small the motor will hesitate and backfire on the first stages of acceleration.

If the accelerating well discharge jet is too large the motor will load from a rich mixture through the full range of acceleration providing the accelerating well bleeder is small enough to keep up the gasoline supply in the accelerating well. However, if the accelerating well bleeder is of such size that the fuel is low in the well the mixture will be rich on the first stages of acceleration, dropping off to a lean mixture after a short period of wide open throttle.

Economizer Needle (Stromberg OE-1 and OE-2).—This needle will seldom give trouble unless someone has tampered with it.

Diagnosis, Needle Lift too High.—If needle lift is too high the motor will have a tendency to run rough and may sputter in the carburetor at speeds above 40 miles per hour. (See Fig. 6).

Diagnosis, Needle Lift too Low.—If the needle lift is too low a condition of poor fuel economy will result. The average needle lift setting is 5/16".

Main Discharge Jet (Stromberg OE-1 and OE-2).—It is seldom in actual practice that a large main discharge jet will have any effect on car performance other than to lower the gasoline mileage. If car performance is good and the gasoline mileage is low then a smaller discharge jet may be tried.

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet, Fig. 7, is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

Economizer Needle Air Bleed (Stromberg OE-1 and OE-2).—The economizer needle air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeder should be avoided.

Diagnosis, Economizer Needle Air Bleeder too Large.—If the air bleeder is too large the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speed a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, Economizer Needle Air Bleeder too Small.—If the air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by car passing over the brow of the hill with the throttle still fully open.

Venturi Tubes (Stromberg OE-1 and OE-2).—On all Model OE Stromberg carburetors the venturi tubes are removable units and are held into the carburetor body by a set screw and lock nut.

In practice it is seldom that trouble from a venturi of wrong size is experienced. However, if this trouble is encountered, a check to see that the venturi is tight in the carburetor body should be made before testing for wrong size.

Diagnosis, Venturi too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened, with throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Specification Diagnosis

(Stromberg Model T)

Stromberg Model T-2.—All Model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and the high speed air bleed, but all specifications as to principle of operation and jet diagnosis are the same as the Model O. See page 175.

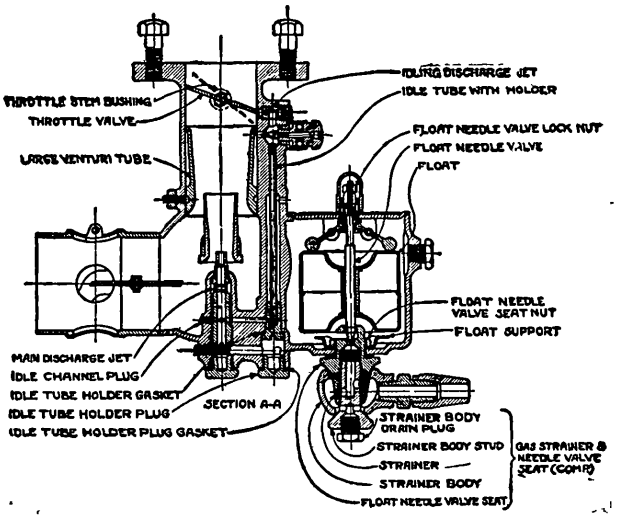


Fig. 7

Cross section view of Stromberg Model O carburetor showing idling and main discharge jets.

High Speed Air Bleeder (Stromberg T-2) — The difference between the air bleed arrangement on Stromberg Models T and O is that the O type has the air bleed needle drilled The T type has a separate air bleed and the needle is blank The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance Therefore, any changes of the air bleeders should be avoided

Diagnosis, Air Bleeder too Large —If the air bleeder is too large, the trouble may be indicated by sputtering of the motor on fast acceleration or a hesitation on slow acceleration Sometimes at extreme high speed a gentle popping in the muffler will be produced similar to the exhaust noise when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on

Diagnosis, Air Bleeder too Small —If the high speed air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark The motor will be logy on acceleration and at road speed

In most cases the trouble can be indicated by the same test procedure used to determine whether a main metering jet is too large The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained If the air bleed is too small a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open

Specification Tables.—The following specification tables contain the carburetor calibration specifications for each model of Stromberg OE and T used on Franklin automobiles

Franklin 10C 1925

(Stromberg OE-1 Engine 3¼"x4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#60–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 3/8")		#64
Main Discharge Jet		‡A–#46, B–#20
High Speed Air Bleeder		
Accelerating Well Bleeder		†#35
Accelerating Well Discharge Jet		#56
Venturi	9/32"	

*The idle jet above the throttle is a #76 wire drill size, the jet below the throttle is a #60 wire drill size
†This is a single end bleeder
‡First bore of main discharge jet is a #46 wire drill, second bore #20 wire drill

Franklin 11, 11A 1925-26

(Stromberg OE-1 Engine 3¼"x4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#60–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 3/8")		#64
Main Discharge Jet		‡A–#46, B–#20
High Speed Air Bleeder		
Accelerating Well Bleeder		†#35
Accelerating Well Discharge Jet		#53
Venturi	29/32"	

*The idle jet above the throttle is a #70 wire drill size, the jet below the throttle is a #60 wire drill size
†This is a single end bleeder
‡First bore of main discharge jet is #46 wire drill, second bore #20 wire drill

Franklin 11B 1926-27

(Stromberg OE-2 Engine 3¼"x4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#56–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")		#65
Main Discharge Jet		‡A–#42, B–#28
High Speed Air Bleeder		
Accelerating Well Bleeder (single end)		†#46
(double end)		†#30–#40
Accelerating Well Discharge Jet		#56
Venturi	31/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #56 wire drill size
†Two types of accelerating well bleeders were used, one a double end bleeder having one end #30 wire drill size and the other end #40 wire drill size, and the other a single bleeder with a #46 hole
‡First bore of main discharge jet is #42 wire drill, second bore #28 wire drill

Franklin 12A, 12B, 130, 1928-29

(Stromberg T 2 Engine 3¼"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 7/32")		Blank
Main Discharge Jet		‡A–#34, B–#18
High Speed Air Bleeder		#68
Accelerating Well Bleeder		†#32
Accelerating Well Discharge Jet		#52
Venturi	1 3/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #54 wire drill size
†This is a single end bleeder
‡First bore of main discharge jet is #34 wire drill, second bore #18 wire drill

Franklin 135, 137 1929

(Stromberg T-2 Engine 3½"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#53–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 7/32")		Blank
Main Discharge Jet		‡A–#34, B–#18
High Speed Air Bleeder		#68
Accelerating Well Bleeder		†#32
Accelerating Well Discharge Jet		#52
Venturi	1 5/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #53 wire drill size
†This is a single end bleeder
‡First bore of main discharge jet is #34 wire drill second bore #18 wire drill

Specification Diagnosis

(Stromberg Model U)

Stromberg Models U-1, U-2 and U-3.—Occasionally jobs will be encountered where someone unfamiliar with the correct carburetor specification calibration procedure has drilled out jet openings In these cases it is sometimes quite difficult to determine just which calibration part is wrong. Since there are seven places at which the internal carburetor adjustment may be changed to affect its operation, the following information is given to enable the mechanic to properly diagnose a condition of trouble where someone has tampered with the carburetor.

Take for example idling jets or the air bleeders, in many cases these openings are made in the carburetor body and drilling out these openings will necessitate installing a new carburetor body in order to obtain the original jet size. Never drill out idling discharge openings under any consideration.

Idling Discharge Jet (Stromberg U-1, U-2 and U-3).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idling jets has drilled out the openings. In these cases, it will generally be found necessary to replace the carburetor body in order to restore the original correct opening sizes.

Diagnosis, Idle Jets too Large.—If the idling jets are too large, the motor will Roll and load regardless of how much air is admitted through the idle adjustment. Also, the motor will have a tendency to idle fast with throttle completely closed.

Main Metering Jet (Stromberg U-1, U-2 and U-3).—The main metering jet or high speed adjustment (B) Fig. 8, controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the metering jet is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Generally, when the main metering jet is too large, the car owner will complain of poor gasoline mileage at all speeds with a tendency in some cases for the motor to run rich on level road. It may also be found that when starting a cold motor the choke can be released immediately. In localities where a hill suitable for testing is not available, the trouble can generally be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the motor will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on first test) and test the car again with wide open throttle in second gear. If reducing the metering jet size corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor, accompanied in most cases with a loss of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one fourth throttle.

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of the wrong specifications. If after changing the metering jet to a larger or smaller size the trouble still exists or is exaggerated, the by-pass jet should next be checked.

By-Pass Jet (Stromberg U-1, U-2 and U-3).—The by-pass jet is shown as the by-pass restriction (T) Fig. 8. The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely, the by-pass jet may be too large; the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large.—If the by-pass jet (T) Fig. 8 is too large, the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available that is steep enough for a test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle conditions. When reducing the size of the by-pass jet, following instructions are recommended. If the by-pass jet in the carburetor is over .040", try five sizes smaller. However, if the by-pass jet in the carburetor is less than .040" try two sizes smaller on first test.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult. To correct this condition, replace with new by-pass valve.

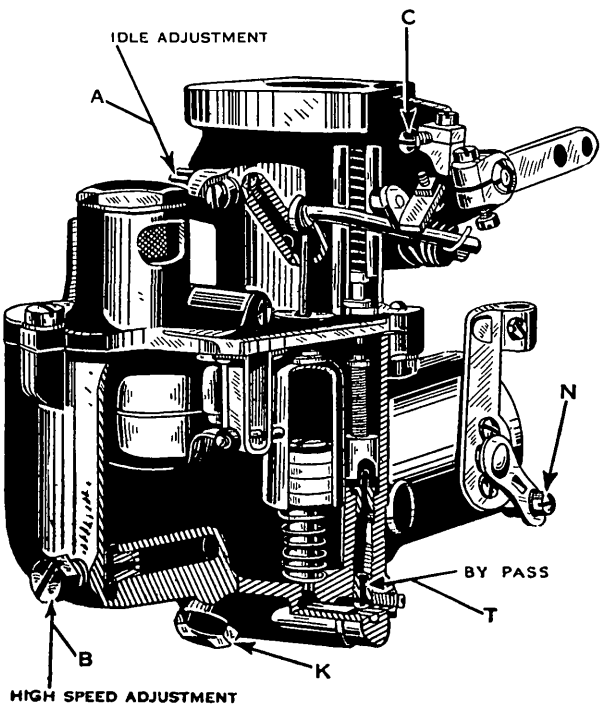


Fig. 8

Sectional view of Stromberg Model U carburetor used on Franklin automobiles. The high speed adjustment (B) is set but may be changed to the adjustable type.

Diagnosis, By-pass Jet too Small.—If by-pass jet is too small, the car owner may complain of lack of power at speeds and on heavy pulls, accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up. A tendency to poor acceleration will prevail under all conditions.

If the trouble symptoms indicate a small by-pass jet try a jet one or two sizes larger.

Main Discharge Jet (Stromberg U-1, U-2 and U-3).—It is seldom in actual practice that a large main discharge jet (P) Fig. 9 will have any affect on carburetor performance other than to lower the gasoline mileage. This condition holds true, however, within certain limits. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. Care should be exercised not to confuse the symptoms caused by a large main discharge jet with those produced by a large by-pass jet. If the trouble is actually caused by a large main discharge jet, reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and Roll at high speeds, the trouble will probably be caused by a main discharge jet that is too large. Care should also be exercised not to confuse the trouble caused by a large main discharge jet with a venturi that is too small. (See information below for small venturi).

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet (P) Fig. 9 is too small, the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull (see paragraph above).

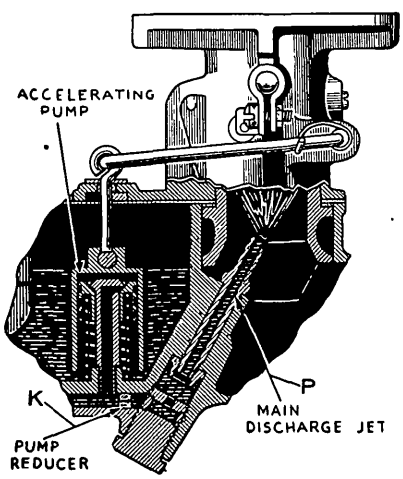


Fig. 9

Cross sectional view of Stromberg Model U carburetor showing the main discharge jet (P), pump reducer (K) and accelerating pump. The throttle is shown in the full open position with the pump cylinder forced down and the piston at the end of its discharge stroke.

High Speed Air Bleeder (Stromberg U-1, U-2 and U-3).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore any changes of the air bleeder should be avoided. In the back of the book will be found more complete information explaining the purpose of the high speed air bleeder (see index in the front of the book).

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on. The car owner may complain of a tendency for the motor to hesitate on slow acceleration and in some cases the motor may die in traffic.

It should be remembered that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, turn to the specification table which contains the correct drill size specifications for the particular carburetor model in question. These carburetor specifications will be found in the table at the end of each specification diagnosis section for the particular carburetor model in question. After the correct air bleed wire drill size is known, see whether someone unfamiliar with the correct carburetor calibration procedure has drilled out the air bleed opening. If the air bleed opening has been drilled out, it may be necessary in order to correct the trouble, to replace the carburetor body. However, if the air bleeder is of the changeable type, a smaller air bleeder may be used.

In most cases an air bleeder that is too large can be checked out on level road test by slowly accelerating the car to approximately 25 miles per hour with the spark half retarded. If the air bleed opening is too large, from one to three flat spots will probably be experienced and in some cases accompanied by a popping back of the motor during the period of slow acceleration.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds. The car owner may complain of low gasoline mileage at all car speeds accompanied by a tendency in extreme cases for the motor to Roll and load at low speeds and on acceleration. On a level road test with wide open throttle, the car will lack speed and power.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass jet that is too large.

If a hill suitable for test purposes is not available the trouble can generally be checked out by level road test in the following way.

First replace the air bleeder with a larger size (not to exceed four sizes larger on the first test). It should be remembered, however, that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passageway is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved when a larger opening is used but if no change is noticed or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Accelerating Pump (Stromberg U-1, U-2 and U-3).—The pump reducer (K) Fig. 9 regulates the flow of gasoline from the accelerating pump and affects the operation of the carburetor during quick acceleration. On Model U carburetors with manually controlled by-pass or economizer valve make sure that the roller of the throttle accelerating pump lever is in contact with the pump lever arm when the throttle is in closed position.

Diagnosis, Pump Discharge Jet too Large or too Small.—If the pump discharge jet is too large the motor will stumble on quick acceleration. If the jet is too small, the motor will usually backfire on quick acceleration. The trouble may be corrected by either increasing or reducing the size of the discharge jet as indicated by the symptoms of the trouble.

Venturi Tubes (Stromberg U-1, U-2 and U-3).—Two types of venturi tube design are used in Stromberg Model U carburetors. In one type the venturi is cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed. In practice it is seldom that trouble from a venturi tube of wrong size is experienced. On the interchangeable type, the venturi is locked into place by a set screw that may work loose. Before testing for wrong venturi size, see that the set screw is tight.

Diagnosis, Venturi too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speeds the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Specification Tables.—The following tables contain the carburetor calibration specifications for Stromberg Model U carburetors used on Franklin automobiles.

Franklin 135, 137 1929

Vacuum Economizer

(Stromberg U-2 Engine 3¼"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#62
Main Metering Jet	.064"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-Pass Jet	.042"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#65
Pump Reducer	.....	#70
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/16"	.....

*The idle jet below the throttle is #55 wire drill size; the jet above the throttle is #62 wire drill size.

Franklin 130 1929

Cast Iron Vacuum Economizer

(Stromberg U-2 Engine 3¼"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#64
Main Metering Jet	.061"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-Pass Jet	.036"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#65
Pump Reducer	.....	#67
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1"	.....

*The idle jet below the throttle is #55 wire drill size; the jet above the throttle is #64 wire drill size.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
FRANKLIN					STROMBERG
1925.....	10C	Own	6	3¼"x4"	OE-1
1926.....	11A	Own	6	3¼"x4"	OE-1
1927.....	11B	Own	6	3¼"x4"	OE-2
1928.....	12A-12B	Own	6	3¼"x4¾"	T-2
1929.....	130	Own	6	3¼"x4¾"	T-2 U-2
1929.....	135-137	Own	6	3½"x4¾"	T-2 U-2
1930.....	145-147	Own	6	3½"x4¾"	U-3

ADJUSTMENT PRECAUTIONS

When adjusting the carburetor on a Franklin automobile, it should be borne in mind that air cooled motors run at a higher temperature than water cooled motors, therefore, extreme care should be exercised to see that the motor is thoroughly warmed up before attempting a carburetor adjustment. If the adjustment is made with the motor below running temperature, the carburetor will have a tendency to run rich with a loss in power and gasoline mileage when the car is speeded up to running temperature.

It is also very important when making a carburetor adjustment that from 10 to 15 seconds' time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operations.

The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough, and then richening it up just to the point of where the motor runs smoothly. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

STROMBERG MODEL OE-1

The same model of Stromberg carburetor was used on both series 10C and 11A Franklin automobiles. However, the carburetor on series 10C was an earlier type and had no air cleaner or electric vaporizer. Adjustments for both series are the same.

High and Low Speed Nozzle Adjustments.—To adjust the carburetor, turn the two screws (A) and (B) Fig. 10 all the way in to their seats lightly; then back the idling screw (A) out or off its seat 12 notches and the high speed adjustment screw (B) out 2½ turns or 40 notches off its seat. With the motor thoroughly warmed up and running at a speed equivalent to about 25 M.P.H. road speed turn the high speed screw (B) in toward its seat, clockwise, notch by notch until the motor speed shows a perceptible decrease; then turn it back off its seat slowly until the motor reaches its maximum speed for that throttle setting. The idling mixture can then be adjusted by closing the throttle to idling speed and turning the idling adjusting screw (A) a notch or two either way until the motor idles smoothly. This adjustment controls the air consequently turning it in gives a richer mixture and turning it out gives a leaner mixture.

Throttle Valve and Choke Valve Adjustment.—The throttle and choke valves are set correctly at the factory and ordinarily should require no further adjustment. However, should adjustment become necessary, the throttle valve should be assembled in line with the slot (I) Fig. 10 on the throttle valve shaft. Likewise the choke valve should be in line with the slot (J) on the choke valve shaft.

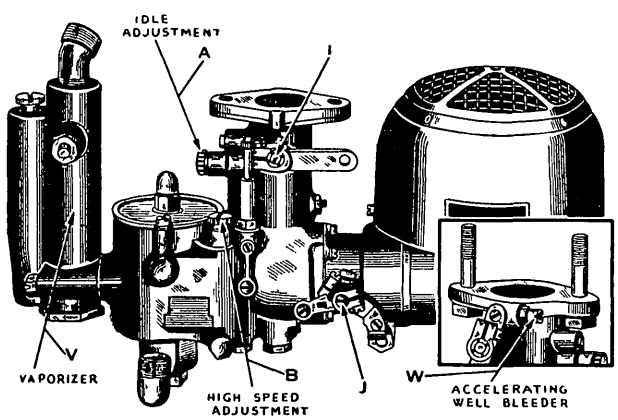


Fig. 10

View of Stromberg Model OE carburetor used on Franklin automobiles. The insert shows the double ended accelerating well bleeder used on later models.

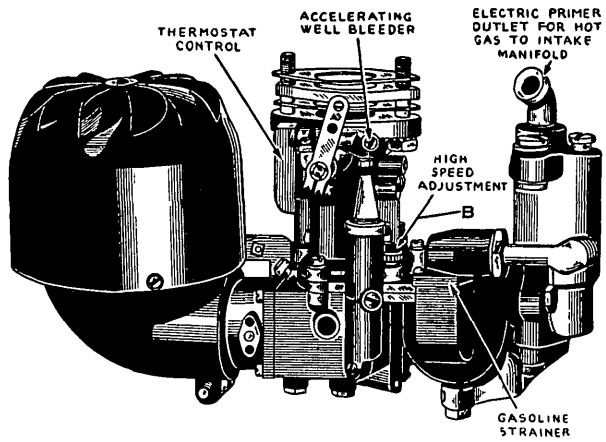


Fig. 11

View of Stromberg Model T-2 carburetor used on Franklin automobiles. These carburetors were equipped with an electric primer as shown. When starting the car, the electric primer was turned on and gasoline drawn through the primer was heated and passed into the manifold in a gaseous state.

Electric Vaporizer.—When the primer switch on the dash is raised, current is turned into a heating coil in the vaporizer (V) Fig. 10 and an electric valve opens a by-pass to the suction yoke. When the motor turns over, heated air and gasoline from the coil chamber are drawn through the by-pass to the suction yoke and on into the cylinders. If the primer does not function properly, remove it from the carburetor and see if the small hole between the primer and the carburetor is not plugged; also see that the heating coil and solenoid valves both operate and that all electrical connections are tight when it is reassembled into position.

STROMBERG MODEL OE-2

The adjustments on the Model OE-2 carburetor are made in the same manner as described for Model OE-1. However, the high speed adjustment screw is on the opposite side of the carburetor. The accelerating well bleeder used on the OE-2 is shown in the insert Fig. 10.

Accelerating Well Bleeder.—Less fuel is required for acceleration in warm weather than during the cold winter months when the motor is slow to warm up and rarely attains the temperature reached in average summer driving. The double end well bleeder (W) Fig. 10 used on Model OE-2 carburetors has two holes in the bleeder screw. One hole—the largest one—is for summer driving and the other hole—the smallest one—is for cold weather driving conditions.

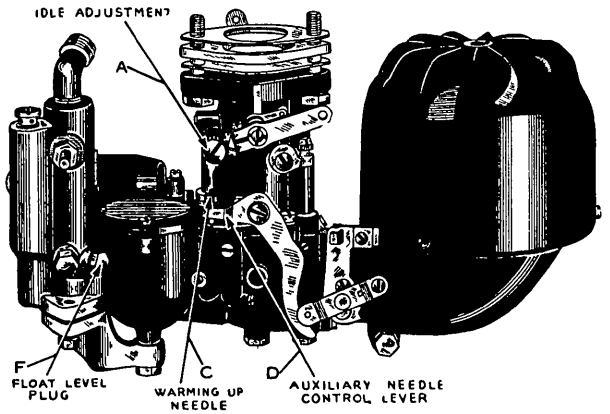


Fig 12

View of Stromberg Model T-2 carburetor used on Franklin automobiles showing the warming up needle (C), float level plug (F) and idle adjustment (A). For high speed adjustment see Fig. 11.

STROMBERG MODEL T-2

In addition to Series 12A and 12B there were some cars of Series 130, 135 and 137 which were also equipped with Stromberg Model T-2 carburetors.

High Speed Adjustment.—The high speed adjustment is supplied with a stop so that the needle can be turned only one-half turn either way from where the arrow on the needle coincides with the arrow head cast on the float cover. The arrows have been set at the factory to give most economical operation under average conditions when the arrows are in line. Under some conditions such as extreme warm or cold weather, economical operation can be improved by a setting one or two notches richer or leaner than where the arrow heads line up.

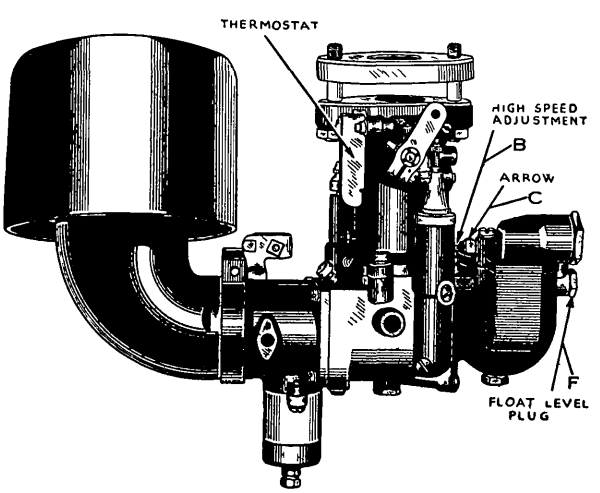


Fig. 13

View of Stromberg Model U-2 carburetor used on Franklin automobiles. These carburetors were equipped with an electric fumer for starting and an accelerating well of the manometer type for acceleration.

To set the high speed adjustment, advance the throttle to a motor speed corresponding to 25 M.P.H. road speed. Turn the high speed adjustment screw (B) Fig. 11 down, clockwise, which gives a leaner mixture, until the motor begins to slow down then turn the screw back notch by notch, which gives a richer mixture, until the motor just smooths out and is running at maximum speed for that throttle opening. The correct position of the high speed needle when properly set is from 36 to 38 notches open or off its seat.

Low or Idling Speed Adjustment.—First adjust the high speed needle and then with the motor idling slowly, turn the idling adjusting screw (A) Fig. 12 just enough that the motor idles smoothly. The normal idling adjustment will be with the needle from 1½ to 3 turns off its seat.

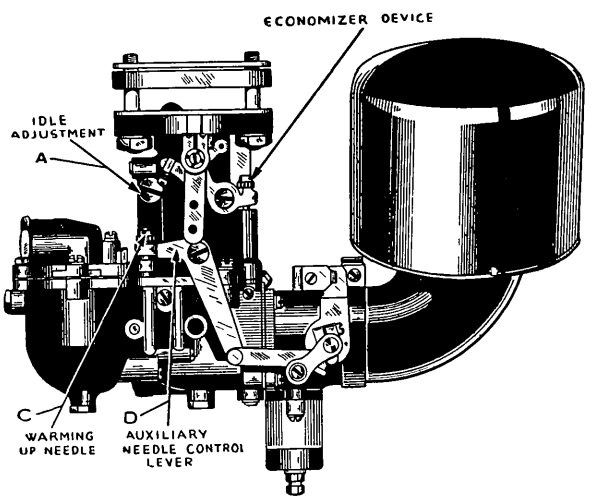


Fig. 14

View of Stromberg Model U-2 carburetor used on Franklin showing the auxiliary needle and needle control lever for starting and warming up This carburetor was also equipped with an economizer device.

Choke Valve Adjustment.—It is very important that when the choke control on the dash is pushed in all the way that the choke valve be wide open and that there be some play in the warming up needle lever (D) Fig. 12 before it begins to lift the warming up needle (C) off its seat.

STROMBERG MODEL U-2

Some cars in Series 130, 135 and 137 were equipped with Stromberg Model T-2 carburetors, the adjustments of which are described in the paragraphs above. Other cars of this series were equipped with Stromberg Model U-2.

The high speed adjustment is supplied with a stop so that the needle can be turned only one-half turn either way from where the arrow on the needle coincides with the arrow head (C) Fig. 13 cast on the cover of the float. The arrows have been set at the factory to give the most economical

operation under average conditions when the adjustment is made with the arrows in line. Under some conditions such as extreme warm or cold weather, economical operation can be improved by a setting one or two notches richer or leaner than where the arrow heads line up.

High Speed Adjustment.—With the motor well warmed up set the hand throttle for a motor speed corresponding to about 35 M.P.H. road speed and turn the high speed needle (B) Fig. 13 down, clockwise, giving a leaner mixture until the motor shows a perceptible decrease in speed. Then turn the screw back, counter-clockwise, giving a richer mixture until maximum motor speed is obtained for that throttle opening. The normal setting for the high speed adjustment is from 36 to 38 notches open or off its seat.

Idling Adjustment.—First adjust the high speed needle and then with the motor idling, turn the idling adjusting screw (A) Fig. 14 slowly, just enough that the motor idles smoothly. The normal idling adjustment will be obtained when the needle is from 1 to 1½ turns off its seat.

Choke Valve Adjustment.—It is very important that when the choke control on the dash is pushed all the way in that the choke valve be wide open and that there be some play in the warming up needle lever (D) Fig. 14 before it begins to lift the warming up needle (C).

STROMBERG MODEL U-3

Idling Adjustment.—Throttle the motor down to minimum steady idling speed and then turn the low speed adjustment or idling needle (A) Fig. 15 to the position where a maximum motor speed for that throttle opening is obtained. The idling adjustment has no affect on the mixture at road speeds above 15 miles per hour. The normal idling adjustment is one-half turn open or off its seat.

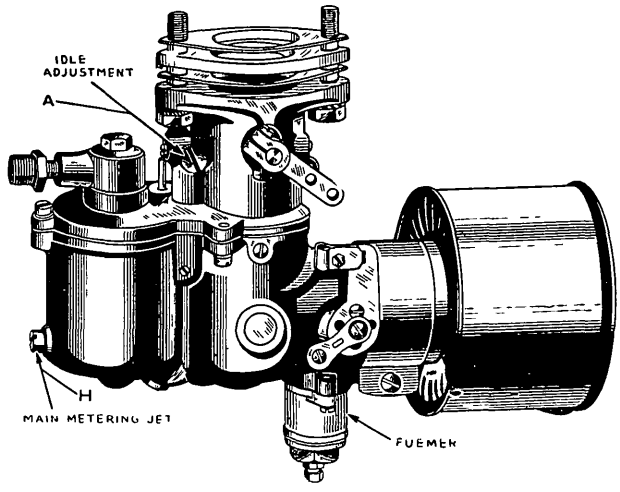


Fig. 15

View of Stromberg Model U-3 carburetor used on late Franklin automobiles. These carburetors have only one adjustment as shown at (A). The high speed adjustment is fixed but may be changed for the adjustable type metering screw.

High Speed Adjustment.—The fuel mixture for high and intermediate speeds is controlled by the main or high speed metering jet (H) Fig. 15 for which there is no adjustment.

Choke Valve Adjustment.—It is very important that when the choke valve lever control on the dash is pushed in the choke valve lever be tight against the lever stop.

Graham-Paige 1928-30

Motor Tune-Up

As a rule when a Graham-Paige automobile is brought in for a motor tune-up it will generally be found that some one has tampered with the spark plugs or distributor contact point settings.

A wide spark gap can generally be indicated on a pull or fairly steep hill, by the car missing a few times and then hanging on one plug. By that is meant that the car will miss all the way up the hill on one cylinder. If this condition exists, spark plug trouble is indicated.

If the trouble is due to contact point trouble, a condition of erratic missing will generally obtain. By that is meant that the car may miss first on one cylinder and then on another.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: Chain adjustment operation is necessary for only those models that have manual timing chain adjustment. If timing chain is loose, proper results cannot be obtained when timing the motor.
3. Synchronize distributor points.
   Note: The above operation is necessary only on 8 cylinder models having double contact distributors.
4. Check ignition timing; adjust if necessary.
   Note: Check to see that the distributor housing rotates freely and that the full range of advance and retard when the advance lever is moved on the quadrant is obtained.
5. Adjust the valve tappets and free up valves.
6. Clean gas line screens; also check gas lines for loose fittings.
   Note: On all models of Graham-Paige, a union in the gas line between the fuel pump and gasoline tank will be found under the frame below the hood latch. On some models this union will be located on the left side; on other models on the right side of the car.
7. Check fan belt; adjust if necessary.
8. Tighten water pump nut. This operation is only necessary when packing gland is leaking.
9. Adjust carburetor; clean if necessary.
   Note: If difficulty is experienced in obtaining a correct idle adjustment on models equipped with Johnson carburetors check to see that the air valve spring is not weak.
10. Road test car.
    Note: The ignition timing should be set so that a slight knock is heard on fast acceleration.

Ragged Idle

Ignition Timing Not Properly Synchronized.—Of all the motor tune-up operations for Graham-Paige automobiles, the most critical is ignition timing, spark plug and contact point settings. Those models equipped with distributors having double breaker arms should be carefully and accurately synchronized. If the points are not properly synchronized, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speed.

To correct this condition, synchronize the points as described under ignition timing.

Spark Plug Point Clearance.—On all models of Graham-Paige a poor idling condition may be caused by the spark plug gaps being spaced too far apart. If the spark plug gap clearance is greater than .027″ the motor may run rough at idling speed (see Ignition Timing Table).

Weak Air Valve Spring.—On all models of Graham-Paige equipped with Johnson carburetors a poor idling condition may be caused by a weak air valve spring. A weak air valve spring is usually the result of back-firing of the motor which reduces the temper of the spring.

A condition of a weak air valve spring can generally be checked out by screwing in the low speed adjustment. If the low speed adjustment is screwed in all the way and the motor still will not idle, the spring will be found to be weak. If the air valve spring is found to be weak, it should be replaced with a new spring.

Hard Starting

Fulcrum Arm Sticking (Schebler Model S).—A condition of hard starting on Graham-Paige automobiles equipped with Schebler S carburetors may be caused by the fulcrum arm sticking in the choke position, thus causing the carburetor to deliver a too rich mixture and loading of the motor.

To correct this trouble, free up and readjust the fulcrum arm assembly.

Poor Acceleration

Failure of Carburetor Butterfly to Open Fully.—On the small models 6-10 Graham-Paige a condition of poor acceleration may be caused by the carburetor throttle rod bending in service. This condition is generally the result of the throttle rod being too long and when the throttle is forced to the full open position, a bend or kink is forced into the rod. To correct this condition, replace with a new rod ¼″ in diameter.

Failure of Automatic Advance.—On those models of Graham-Paige equipped with automatic advance, poor acceleration may be caused by the automatic advance sticking.

To correct, remove distributor assembly and free up advance mechanism.

Accelerating Pump (Johnson Carburetors).—A condition of poor acceleration on Graham-Paige cars equipped with Johnson carburetors, may be caused by failure of the accelerating pump. Two conditions of trouble may exist; either the pump may be disconnected from the throttle valve or the gasket between the pump and the carburetor diaphragm may leak.

To correct the trouble, either replace the gasket or reassemble the pump to the throttle as the case may be. In those cases where the pump link works loose from the throttle, the pin will generally be found to be too short.

Lack of Power

Heat Manifold Control.—On the late models of Graham-Paige cars using heat manifold controls, a lack of power may be caused by the heat manifold control not working properly and thus overheating the carburetor. Check to see that the heat manifold control wire is working properly and that the heat control opens and closes as it should.

Motor Cutting Out on a Pull

Spark Plug Point Clearance.—On all models of Graham-Paige, if the spark plug points are set too wide, the motor will cut out on a pull. The average setting on Graham-Paige motors for the spark plug gap is .025" but in a few cases where trouble is experienced a .021" setting may be tried.

Weak Breaker Springs.—On some of the early models Graham-Paige, cutting out of the motor may be caused by weak breaker springs. This trouble was most pronounced at high speeds.

To correct, replace the old spring with a new one

Motor Missing at High Speeds

Fuel Pump Failure.—A condition of missing at high speed on Graham-Paige models equipped with fuel pump feed may be caused by the diaphragm actuating spring breaking down in service. As a rule, this condition of trouble is not noticeable at low speeds but when the motor is speeded up the weakened condition of the spring prevents the proper operation of the diaphragm and a low fuel level is the result which in turn causes a failure of the motor.

To correct this trouble, replace the pump diaphragm springs.

Motor Noises

Pre-Ignition.—In extreme cases where trouble is experienced with a knock caused by pre-ignition, try a closer spark plug setting not to exceed on the lower limit, .021". In some cases it may be necessary to change the plugs for a colder running type.

OIL PRESSURE

Model and Year	Min	Max.
6-10—1928	5 lbs.	40 lbs.
6-14—1928	5 lbs.	40 lbs.
6-19—1928	5 lbs.	40 lbs.
6-29—1928	5 lbs.	40 lbs
8-35—1928	5 lbs.	40 lbs
6-12—1929	5 lbs	40 lbs.
6-15—1929	5 lbs.	40 lbs
6-21—1929	5 lbs.	40 lbs
8-27—1929	5 lbs.	40 lbs
8-37—1929	5 lbs.	40 lbs
Std 6—1930	5 lbs.	50 lbs
Spec 6—1930	5 lbs.	50 lbs.
Std 8—1930	5 lbs.	50 lbs.
Spec. 8—1930	5 lbs.	50 lbs.
Custom 8—1930	5 lbs.	50 lbs.

IGNITION TIMING

Three different types of distributors have been used on Graham-Paige cars since 1928. Six cylinder models were equipped with single and double breaker arm distributors On the double breaker arm types the points are timed to break contact simultaneously Eight cylinder models came equipped with double breaker arm distributors. Each set of points operates a separate coil and must be timed separately.

Ignition Timing Table

The following table contains complete ignition timing information for Graham-Paige automobiles Special care should be exercised to see that the contact point clearance is correctly set before attempting a timing operation.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con Pt Clear	Fly-Wheel Travel	Spark Lever Position		
GRAHAM-PAIGE						
1928	610	020"	7° B	Adv	* 025"	1-5-3-6-2-4
1928	614	020"	7° B	Adv	* 025"	1-5-3-6-2-4
1928	619	020"	7° B	Adv	* 025"	1-5-3-6-2-4
1928	629	020"	7° B	Adv	* 025"	1-5-3-6-2-4
1928	835	020"	7° B	Adv	* 025"	1-6-2-5-8-3-7-4
1929	612	020"	1° B	Adv.	* 025"	1-5-3-6-2-4
1929	615	020"	1° B	Adv	* 025"	1-5-3-6-2-4
1929	621	020"	6° B	Adv	* 025"	1-5-3-6-2-4
1929	827 837	020"	†8° B	Adv	* 025"	1-6-2-5-8-3-7-4
1930	Std 6	020"	1° B	Adv	* 025"	1-5-3-6-2-4
1930	Spec 6	020"	1° B	Adv.	* 025"	1-5-3-6-2-4
1930	Std Spec 8	020"	†5° B	Adv	* 025"	1-6-2-5-8-3-7-4
1930	Custom 8	020"	2° B	Adv	* 025"	1-6-2-5-8-3-7-4

B —Before top dead center. Adv —Spark lever fully advanced

*—In hilly localities where trouble is experienced with motor ping or cutting out try a 022" spark plug gap setting. If a close spark plug gap setting is used make sure that the contact point clearance does not exceed 020".

†—On Models 8-27 and 8-37 1929, the flywheel mark IGN-1 is located approximately 3/8" ahead of marks D C. 1-8 and IGN-3 is just ahead of mark D C. 3-6 On Standard and Special 8 models the ignition timing marks on the flywheel are SE-ADV-1 (spark fully advanced #1) located approximately 35/64" ahead of T D C 1-8 and mark S F.-ADV-3 is just ahead of T D C 3-6

Models 6-10 1928, 6-12, 6-15, 6-21 1929 and Standard Six 1930.—The distributor on these models has a single breaker arm. To time the ignition, first see that the distributor is fully advanced or actually moves counter-clockwise as far as the slot in the advance arm and the stop screw will permit. Then crank the motor until No. 1 piston is coming up on compression stroke. The contact points should just start to open when the flywheel mark "Spark-Advance" appears at the indicator in the flywheel housing. The time at which the contact points open can be advanced or retarded by loosening the clamp screw and turning the distributor within the advance arm. Turning it clockwise retards the spark; anti-clockwise advances the spark.

Models 6-14, 6-19, 6-29 and 8-35 1928.—This distributor has two sets of breaker points which break simultaneously. It is important that the gap clearance of both sets of points be set at .020". Time the distributor so that the points just break—spark control in full advance position—when No. 1 piston is approaching T.D.C. of the compression

stroke and the flywheel mark "Spark-Full Advance" appears at the indicator on the flywheel housing.

Models 8-27, 8-37 1929, Standard and Special Eight 1930.—This distributor is provided with double contact arms actuated by a four lobe cam. The contact points break alternately, each set of points firing a separate bank of cylinders.

To time the ignition, first adjust the gap clearance, of the left hand pair of points—the points mounted on the stationary base—to .020". Then crank the motor over one-quarter turn and adjust the right hand pair of points mounted on the adjustable base. The timing of the left hand pair of points may be changed by moving the whole distributor body within the advance arm. The right hand set may be adjusted independently by moving the adjustable base plate mentioned above.

Crank the motor until No. 1 piston is entering compression stroke and the ignition mark for No. 1 cylinder, on the flywheel, is directly under the pointer on the flywheel housing. With the spark control in fully advanced position, loosen the clamp screw in the distributor arm and rotate the distributor in a counter-clockwise direction until the stationary set of points just break Use test lamp. Continue to crank the motor until the ignition mark for No. 3 cylinder, on the flywheel is under the pointer and adjust the right hand set of points by moving the adjustable plate until the points just start to break contact. Recheck the timing.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for all Graham-Paige models from 1928 to 1930 inclusive. All tappet adjustments are for hot motors unless otherwise specified

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int Valve	Exh. Valve
		Int	Exh.	Int	Exh				
GRAHAM-PAIGE									
1928	610			006"	010"	D C		Opens	
1928	614		..	006"	010"	D C.		Opens	
1928	619			010"	010"	D C.		Opens	..
1928	629			010"	010"	D C		Oepns	:
1928	835			008"	008"	1/32"A	017"A	Opens	:
1929	612			006"	010"	D C.		Opens	
1929	615			006"	010"	D C		Opens	
1929	621			010"	010"	D C		Opens	
1929	827, 837			008"	008"	1/32"A	017"A	Opens	
1930	Std 6 (44)			010"	010"	D C		Opens	
1930	Spec 6 (45)			010"	010"	D C		Opens	
1930	Std Spec 8		.	010"	010"	D C		Opens	
1930	Custom 8			010"	010"	1/32"A	017"A	Opens	

A —After top dead center D C —Top dead center

Models 6-10, 6-14, 6-19, 6-29 1928, 6-12, 6-15, 6-21 1929, Standard 6, Special 6, Standard 8 and Special 8 1930.—Set the tappets of the intake valve for No. 1 cylinder to the correct clearance as given in the Valve Timing Table. Crank the motor until No. 1 piston is at top dead center of its exhaust stroke. At this point the intake valve for No. 1 cylinder should just start to open and the mark on the flywheel for inlet open should register with the indicator on the flywheel housing.

Models 8-35 1928, 8-27, 8-37 1929 and Custom 8 1930.—Set the tappets of the intake valve for No. 1 cylinder to the correct clearance as given in the Valve Timing Table. Crank the motor until No. 1 piston is .017" past top dead center of its exhaust stroke. At this point the intake valve of No. 1 cylinder should just start to open and the mark on the flywheel for inlet open should register with the indicator on the flywheel housing.

TIMING CHAIN ADJUSTMENT

Graham-Paige Models 6-10 and 6-14 1928, 6-12 and 6-15 1929 and all 1930 Models.—The timing chain adjustment is obtained by loosening the two bolts which secure the flange of the water pump support to the timing chain case and tighten the adjusting screw at the lower outside edge of the support flange. This adjusting screw should be tightened until a slight humming noise develops at a motor speed equivalent to 25 miles per hour then be backed off until the noise disappears. Tighten the adjusting screw lock nut securely after this adjustment is completed.

Graham-Paige Models 6-19, 6-29 and 8-35 1928 and 6-21, 6-27 and 8-37 1929.—Chain sag is controlled automatically and therefore requires no manual adjustment.

GAS LINE SCREENS

All models of Graham-Paige 1928-30 are equipped with fuel pump feed. Strainer screens are located in the top of the sediment bowl at the fuel pump, Fig. 1, and at the carburetor. To clean the fuel pump screen, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new one.

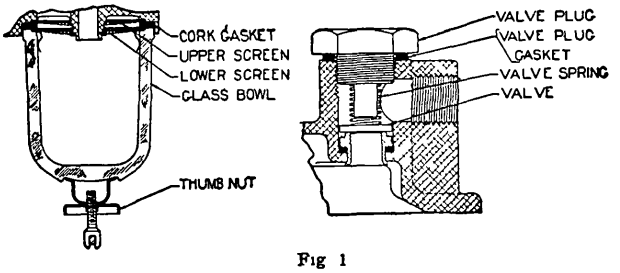


Fig 1

Cross sectional view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl.

The valve disc is held in position by a spring which in turn is held in place by the valve plug If the valve plug is removed see that the valve plug gasket is in good condition when plug is replaced.

To clean the strainer screen at the carburetor, remove the strainer plug and strainer and wash thoroughly in gasoline and blow clear with air.

Carburetor Specifications

FLOAT LEVEL

The following paragraphs contain float level measurements for all carburetors used on Graham-Paige automobiles.

Carter Model DRJHO-8.—The correct float level is 9/16″ from the top of the float to the machined surface of the carburetor body casting when the needle is in the closed position, Fig. 2. This measurement should be taken on the side of the float opposite the gasoline intake needle. To adjust the float level, bend the float lever lip up to lower the gasoline level and down to raise it.

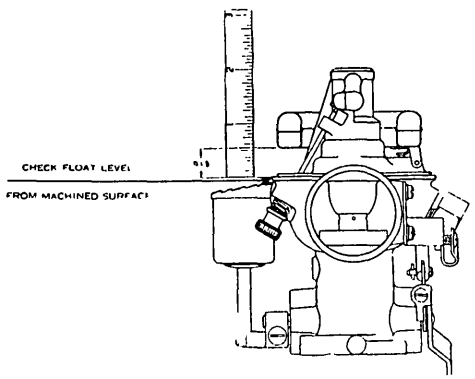


Fig. 2

Sectional view of Carter carburetor Model DRJHO-8 showing the point at which the float level measurement should be taken. The correct float level for this model carburetor is 9/16″.

Johnson Model H-1 and 1¼″.—The fuel level will be correct when the lower face of the float is 1″ below the machined surface of the diaphragm body with the float bowl gasket removed, Fig. 3. This dimension should be uniform for the entire circumference of the float. All measurements should be taken with the float valve closed.

To adjust the float level, bend the brass float support up or down until the correct measurement is obtained.

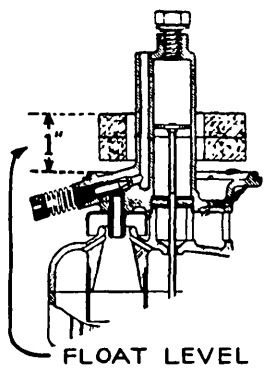
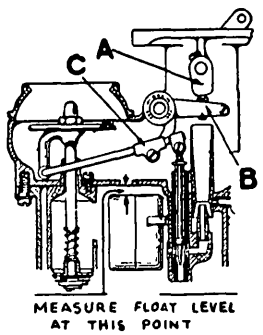


Fig. 3

Sectional view of Johnson carburetor used on Graham-Paige automobiles. The float encircles the lower portion of the diaphragm body and the float measurement should be taken from the lower surface of the float to the milled flange of the carburetor body as shown. To take the float measurement, hold the carburetor upside down so that the float valve will be in the closed position.

Fig. 4

Showing point at which float level should be measured on Schebler Model S carburetors. The quickest method of checking the float level of Schebler carburetors is to see that the float lever arm stands approximately parallel with the middle flange of the carburetor body, with the float valve closed.



Johnson Model R.—The fuel level will be correct when the lower face of the float is 1¼″ below the machined flange of the diaphragm with the float bowl gasket removed, Fig. 3. This dimension should be uniform for the entire circumference of the float. All measurements should be taken with the float valve closed.

To adjust the float level, bend the brass float support up or down until the desired measurement is obtained.

Detroit Lubricator 1¼″, 1½″ and 1¾″.—The fuel level in the float bowl should stand between 13/16″ and 15/16″ below the machined top surface of the float chamber casting (see Fig. 13). This fuel level will be obtained when the distance from the top of the float to the machined top surface of the float chamber casting is 5/16″.

Schebler Model S-1½″.—The fuel level will be correct when the distance measured between the top of the float and carburetor body is ⅛″ with float valve in seated position. (See Fig. 4).

CARBURETOR SPECIFICATION DIAGNOSIS

The following paragraphs contain carburetor specification information for Carter, Johnson and Schebler used on Graham-Paige automobiles. The information will be found arranged in alphabetical order under the carburetor heading.

CARTER CARBURETORS

Carter Model DRJHO-8.—This carburetor is a multiple jet, plain tube carburetor with adjustments for both high and low speeds.

Maximum economy is obtained at approximately 20 miles per hour and minimum at wide open throttle. Low speed jet assemblies supply gasoline to the motor at idle engine speed and up to approximately 18 miles per hour. Gasoline is supplied to the low speed jet assemblies through a drill passage connecting the low speed jet chamber with the carburetor well. At idling speed, gasoline is drawn through the low speed jet and idling port at the edge of the throttle valve. The idling adjustment screw regulates the amount of air entering this port. Backing out the adjustment screw admits more air and consequently makes the idle mixture leaner. (See Fig. 5).

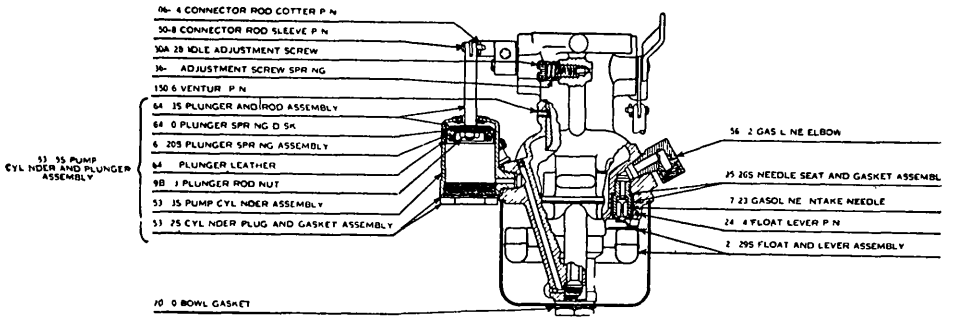

06- 4 CONNECTOR ROD COTTER P N
50-8 CONNECTOR ROD SLEEVE P N
10A 28 IDLE ADJUSTMENT SCREW
10- ADJUSTMENT SCREW SPR NG
150 6 VENTUR P N
64 35 PLUNGER AND ROD ASSEMBLY
64 0 PLUNGER SPR NG D SK
6 209 PLUNGER SPR NG ASSEMBLY
64 PLUNGER LEATHER
98 1 PLUNGER ROD NUT
53 35 PUMP CYL NDER ASSEMBLY
53 75 CYL NDER PLUG AND GASKET ASSEMBLY
53 35 PUMP CYL NDER AND PLUNGER ASSEMBLY
10 0 BOWL GASKET
56 2 GAS L NE ELBOW
35 265 NEEDLE SEAT AND GASKET ASSEMBL
7 23 GASOL NE NTAKE NEEDLE
24 4 FLOAT LEVER P N
2 295 FLOAT AND LEVER ASSEMBLY

Fig 5

Cross sectional view of Carter Model DRJHO 8 carburetor used on 1928 models of Graham-Paige The illustration shows a cross section view of the accelerating pump and a cutaway section of the id e adjustment This carburetor is also equipped with a high speedadjustment (see Fig 12)

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber The high speed adjusting screw supplies gasoline to the carburetor well From this well, a combination of gasoline and air is drawn into the nozzle chamber through accelerating jets on the side of the nozzle intermingling with fuel from the vertical jet This combination forms a fine spray which is carried by standpipe to the venturi or main air passage where it is absorbed by incoming air forming a mixture on which the engine operates Jets on the side of the nozzle come into operation in direct proportion to the throttle position The further the throttle is opened, the more jets are in operation At wide open throttle, all jets are working and the engine is getting a maximum supply of fuel

Carburetor Specifications. — The following table contains complete carburetor calibration specifications for Carter Model DRJHO-8 used on Graham-Paige 1928 automobiles To read, hold the carburetor air intake from you

Make of Engine. Graham-Paige No of cylinders 6 Four cycle

Carburetor Model: DRJHO–8 Size 1 inch Finish Duco body, brass bowl

Size Main Venturi: 29/32 inch Upper well depth from standpipe seat ¼ inch

Standpipe: Round nose top 7/16 inch I D , with 5/16 inch venturi On No 54 air hole Two air slots 189 to 192 high by 311 to 314 wide Four No 37 cross holes ½ inch from top

Low Speed Jet: No 75 drill By pass No 60 drill Two holes 1 11/16 inch from top Economizer No 50 drill

Float Level: Top of float to be 9/16 inch from machined surface of casting

Accelerating Pump: Air bleed through plunger shaft None

Idle Port Opening Above Valve With Valve Tight Closed: 039 inch to 043 inch

Idle Port Length: 156 inch Width 040 inch

Type of Idle: Air bleed

Vent: Inside No 50

Nozzle: Diagonal jet None Vertical jet No 65 drill Top jet No 30 drill

Accelerating Jets	No	Drill Size	Distance from Top of Tube
(Combination No 57)	2	38	5/8 inch
" " "	2	68	1 inch
" " "	1	34	1⅜ inch

High Speed Needle Seat: No 54 drill

Throttle Lever: Location Right side Type Stamped steel

Length: 1¼ inch In center of range lever points toward you To close throttle, move lever up.

Choker: Location in venturi Type Cone Choker lever on right side In open position Points down To close choker, move lever from you

Gasoline Intake Needle: Square vertical Needle seat Vertical with No 48 needle seat hole

Gasoline Line: Size ¼ inch

Gasoline Connection: Weatherhead elbow Points down

Remarks: Recommended setting for idle adjustment screw Three quarters to one and one quarter To make mixture richer Turn adjustment screw in
Do not idle engine below 300 R P M with spark retarded
Recommended setting for high speed needle Seven-eighths to one and three-eighths turns open

JOHNSON CARBURETORS

Two types of Johnson carburetors have been used on Graham-Paige automobiles Both carburetors are very similar in operation with the exception that the Model H carburetor is the small unit having the air valve stabilizer mounted within the carburetor diaphragm and the carburetor ranging from 1" to 1¼" in size The Model R carburetor has the air valve stabilizer mounted outside of the carburetor diaphragm and the carburetor size ranges from 1½" to 1¾"

Johnson carburetors used on Graham-Paige cars are of the plain, air valve type provided with an economizer, accelerating pump, cold priming device and an interconnected throttle and choke The fuel mixture is controlled chiefly by the action of an automatic air valve which takes care of the carburetor through its full range of operation Each carburetor is correctly calibrated at the factory, therefore, the jet specification information consists chiefly of inspecting the carburetor for dirty or plugged up pasageways and openings and worn parts

Occasionally, jobs will be encountered where someone unfamiliar with Johnson carburetors has tampered with the calibration specifications by drilling out the economizer tube or by changing or stretching the air valve spring Under no consideration should these parts be changed or tampered with in any way

Inspection Instructions

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc , remove the carburetor from the car, thoroughly wash and clean in gasoline and inspect as follows:

Warped Parts.—Inspect the milled surfaces of the upper and lower body flanges where the two halves of the carburetor are bolted together, to see that these flanges are not warped or distorted in any way.

If the upper body flanges are warped, it may distort the air valve seat causing a leak at the air valve and thus throwing the carburetor adjustment out of balance.

Warped or distorted body flanges may be checked out by the use of a feeler gauge inserted between the upper and lower halves of the body before the carburetor is dismantled or by using a straight edge on the face of the flange after the lower half of the body has been removed. To correct this trouble, replace the carburetor body.

Air Valve Spring.—The air valve spring (15) Fig. 6 is a calibrated part and should not be stretched or tampered with in any way. Weak air valve springs will be most noticeable at high speeds causing a lean mixture. If when the carburetor is overhauled or dismantled for cleaning, there is any doubt as to the condition of the air valve spring, it should be replaced with a new part. See table of Air Valve Springs for correct part numbers below.

Air Valve Springs

Car	Model	Year	Carb. Model	Carb. Size	Air Valve Spring No.
GRAHAM-PAIGE	610	1928	Model H	1 "	938
"	619 & 629	1928	" R	1⅛"	924
"	612	1929	" H	1¼"	638
"	615	1929	" R	1⅛"	942
"	621	1929	" R	1⅜"	924
"	825 & 627	1929	" R	1¾"	924

Economizer Tube.—The purpose of the economizer is to admit an air stream into the middle of the gasoline flow for economy. The economizer tube (35) Fig. 7, conducts air into a drilled passageway leading to the chamber lying between the spray needle seat and the jet (9) Fig. 6 as shown at (48) Fig. 8 in the cross section view of a Johnson Model R diaphragm. At this point, **the air is mixed with gasoline** stream flowing upward through the jet. The economizer is open at idle and all throttle positions and car speeds up to approximately 55 miles per hour. As the engine speed increases, the rate of air flow increases more rapidly than does the rate of gasoline flow, gradually bringing about a leaner condition requiring that the air leaks through the economizer be stopped, thus transferring the vacuum directly to the high speed spray jets for open throttle conditions. At higher speeds or when additional power is required at low speeds, the opening motion of the throttle lever (34) Fig. 7 produces a rotation of the throttle valve cross shaft and causes the economizer lever and cap assembly (33) floating on this shaft to rotate by means of a coil spring, to a position such that the cap closes the opening in the upper end of the economizer tube (35). Additional opening of the throttle does not further affect the action of the economizer.

Jobs may be encountered where someone unfamiliar with Johnson Carburetors has drilled out the economizer tube opening which is a calibrated part. On the base of each economizer tube stamped on the hexagon nut portion a number will be found which corresponds to the wire drill size of the tube. If trouble is experienced with the motor loading or difficulty is encountered when attempting an adjustment, check to see that the opening in the economizer tube corresponds with the drill size stamped on the base of the tube.

Air Valve.—The air valve should be inspected for wear and loose hinges. When the motor is not running, the air valve is closed, but when the motor is in operation, the air valve is continually off its seat and operates automatically to supply the requirements of the engine. If

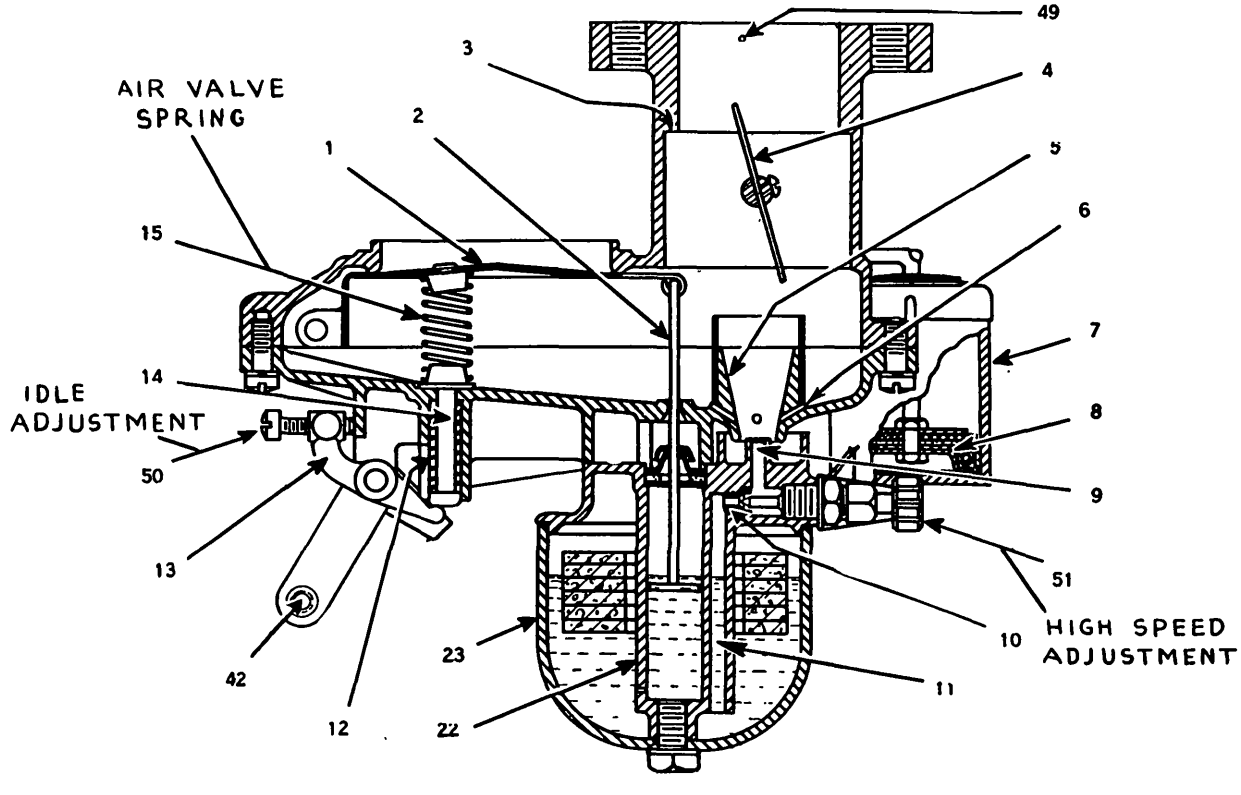


Fig. 6

Cross section view of Johnson Model H carburetor used on Graham-Paige automobiles showing location of the high and low speed adjustment. Note that the stabilizer assembly (22) is located in the diaphragm of the carburetor.

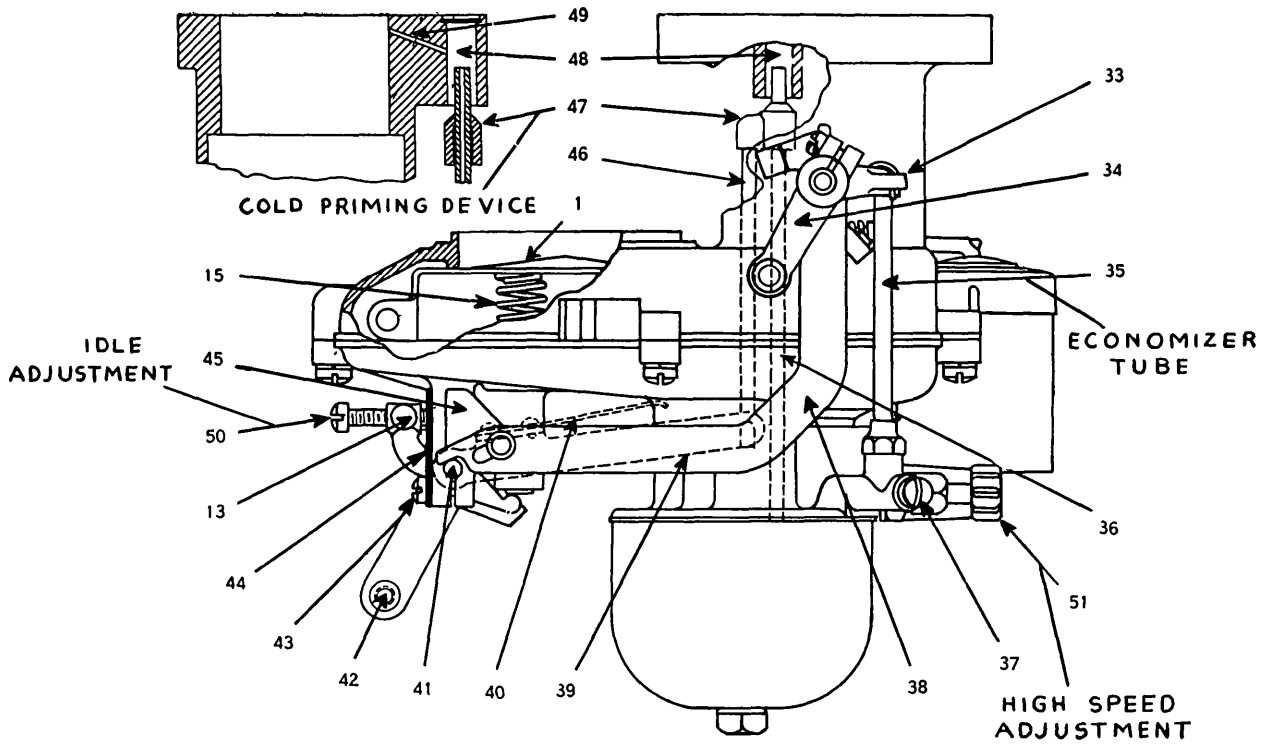


Fig. 7

Cutaway sectional view of Johnson Model H carburetor used on Graham-Paige automobiles. The insert to the left illustrates the cold priming device. This device consists of a brass tube opening at its lower end into the float chamber and extending up into the air chamber which is cast on the side of the carburetor flange.

the hinges are excessively worn or loose, the air valve may not operate correctly and thus upset the balance of the carburetor.

Stabilizer Piston.—The automatic air valve is stabilized by a dash pot consisting of a brass piston (27) Fig. 9 operating in a well of gasoline. The piston is connected to the air valve by a plunger rod (2). The lower end of the stabilizer well is closed and the well is kept filled with gasoline by a drilled hole (26) leading from the float chamber. The piston fits loosely in the dash pot and permits gasoline to flow slowly from above the plate to below and vice versa. A flat brass washer (29) and a cup shaped brass washer (31), between which is a felt washer (30) loosely around the plunger rod (2) at the top of the dash pot. A floating cup shaped brass washer (32) lying above these three washers acts to exclude dust. The space above the washer is opened to the atmosphere. The action of the piston in the gasoline filled well provides a retarding force preventing fluttering of the air valve, particularly on open throttle and low speeds.

When the carburetor is dismantled for any purpose, the stabilator piston assembly and washer should be inspected to see that they are in good condition.

Accelerating Pump.—The accelerating pump (12) Fig 10, is an integral part of the carburetor and is located on the side of the carburetor body. The pump is in effect a single acting air pump in which a leather piston expanded by a coil spring and supported by suitable washers is actuated by a plunger rod connected to a lever mounted on the throttle valve cross shaft The piston slides in the cylinder which is open to the atmosphere at the top and connected to an air passage leading into the upper part of the float chamber bowl.

Air is forced on the down stroke of the pump into the air space at the top of the float chamber Under normal conditions, the pressure on the gasoline in the float bowl is atmospheric due to the leakage of air through the air bleed. This pressure is increased temporarily whenever the plunger in the pump is quickly forced down by quickly opening the throttle. The action of the increased pressure in the float chamber causes a sudden increase of the rate at which the gasoline is

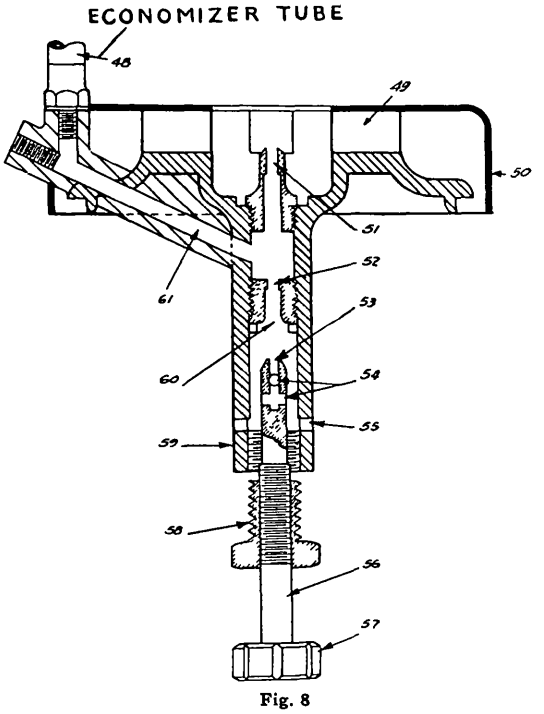


Fig. 8

Cross sectional view of Johnson Model R carburetor diaphragm. Note the point at which the lower end of the economizer tube enters the diaphragm to admit air to the main nozzle.

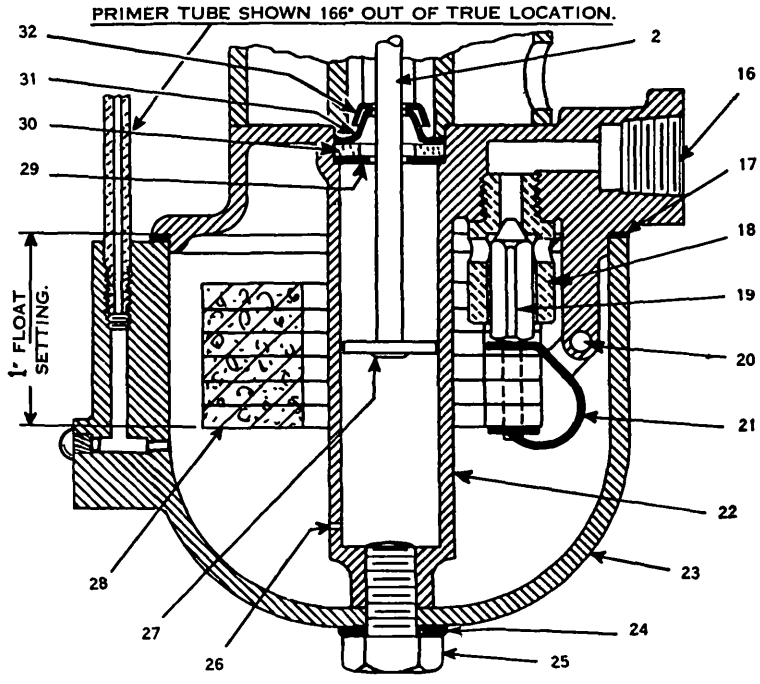


Fig 9

Cross section view of lower half of Johnson Model H carburetor used on Graham-Paige automobiles. The cold primer tube is shown on the left side of the carburetor float bowl. The air valve stabilizer washer assembly is shown at (29), (30), (31) and (32).

The float chamber (23) receives gasoline from the fuel pump through the feed line entering the float chamber at (16). The level of the gasoline in the float chamber is regulated by a laminated U-shaped impregnated cork float (28) surrounding the air valve dash pot (22). The brass float support (21) hinged as shown at (20) bears against the gasoline inlet needle (19) closing it when the gasoline level is at the correct height in the float chamber.

The purpose of the cold priming device shown in the illustration 166° out of true location is to provide an exceptionally rich or priming mixture for starting the engine in extremely cold weather. When the choker is closed, the cold priming tube draws gasoline from the float bowl and empties it into the throat of the carburetor.

forced to the nozzle slightly ahead of the air stream through the automatic air valve. When the throttle is opened slowly, the air in the pump is forced out through the air bleed instead of into the float chamber so that the accelerating pump does not have any affect upon the mixture.

On Model R carburetors, a thermostat control (13), Fig. 10, is used to regulate the action of the accelerating pump according to temperature conditions. This device provides a hole leading out of the lower end of the accelerating pump chamber bleeding the air which otherwise would be forced into the float chamber. This hole is automatically opened and closed by a felt button attached to the lower end on a thermostatically controlled arm. The action is such that the button uncovers the hole as the operating temperature rises and closes it when the temperature is low.

If trouble is experienced on acceleration with cars equipped with Johnson Model R carburetors, check to see that the accelerating pump thermostat is working correctly. If the thermostat is found to be defective, replace with a new unit.

DETROIT LUBRICATOR CARBURETORS

Effective with Graham-Paige engine Nos. 899857 and 738254 respectively, the Models 6-12 and 6-15 are equipped with Detroit Lubricator carburetors. Detailed information describing the principle of operation and adjustment of these carburetors will be found in the Adjustment Section, page 193.

SCHEBLER CARBURETORS

In 1928 Graham-Paige 6-14 came equipped with Schebler Model S 1½" carburetor. This is an air valve type of carburetor and very little trouble has been experienced in service other than to replace worn parts and see that the carburetor jets and passageways are clean and that all adjustments are correctly made.

If trouble is experienced in obtaining a correct carburetor adjustment, the carburetor should be removed from the car, dismantled, thoroughly cleaned and inspected for defective parts.

Inspection Instructions

The main calibration parts of a Schebler Model S carburetor are the air valve spring (A) Fig. 11, the needle valve complete (B), the accelerating pump cross passage (E) and the accelerating pump cylinder (F).

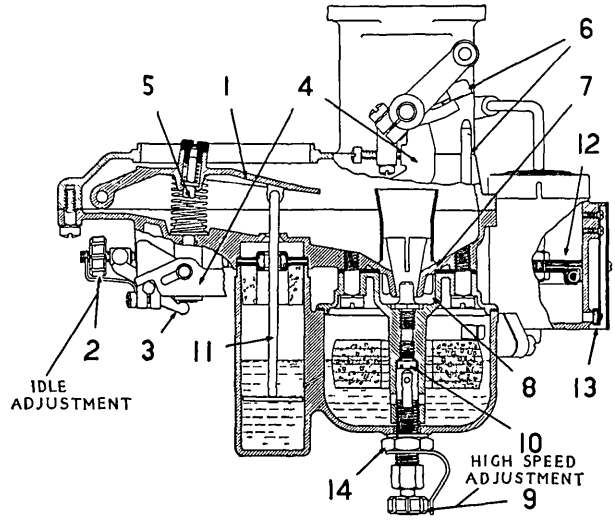


Fig 10

Cross sectional view of Johnson Model R carburetor used on Graham-Paige automobiles. As shown in the illustration, the stabilizer assembly is mounted outside of the carburetor float bowl.

The accelerating pump is mounted rigidly to the carburetor body and is thermostatically controlled as shown at (13). The economizer tube and the economizer tube cap mounted on the throttle lever are shown at (6).

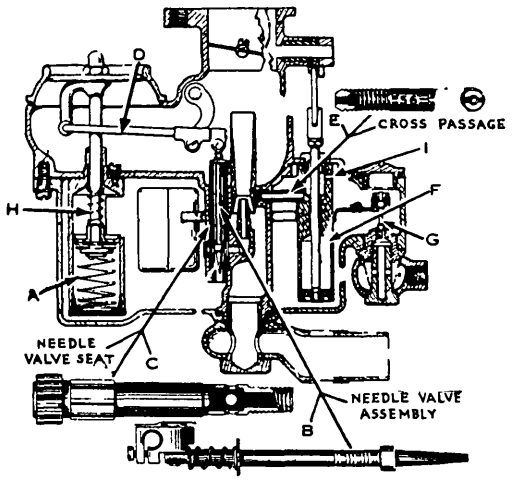


Fig. 11

Cross sectional view of Schebler Model S carburetor used on Graham-Paige automobiles. (A) air valve spring, (B) needle valve complete, (C) needle valve seat; (D) needle valve lift lever; (E) accelerating pump metering or cross passage, (F) accelerating pump cylinder, (G) float needle valve assembly.

Air Valve Spring.—Occasionally an air valve spring (A) Fig. 11 may weaken in service, causing a lean mixture condition that cannot be overcome by adjustment. When this condition is encountered, the spring should be replaced with a new part. (See specification tables below).

Needle Valve Lift Lever.—A condition of sticking air valves may be caused by a worn needle valve lift lever (D) Fig. 11 When this condition occurs, carburetor operation will be erratic, depending upon the position in which the air valve sticks. Dismantle the carburetor and replace the worn part with a new lever.

Needle Valve Assembly.—Trouble in obtaining a correct carburetor mixture may be due to a wrong needle valve assembly (B) Fig 11. If the mixture is too rich, try a smaller needle; if the mixture is too lean, try a larger needle. If customer complains of poor gasoline mileage and the mixture seems to be rich, try a smaller needle.

Accelerating Cross Passage.—The accelerating cross passage (E) Fig. 11 is a calibrated part and has the size of the passage stamped on the side of the body as shown in the illustration. The number of the passage corresponds to a wire drill size. These passages should never be drilled out nor soldered up under any consideration. If a different size passage is needed, get a new part either from the carburetor manufacturer or from a Schebler service station.

If the cross passage is too small, the engine will fail to accelerate properly; if too large, the engine will load and act sluggish on acceleration.

Graham-Paige 614 1928

(Schebler S 1½"; Engine 3⅛"x4½")

Description of Part	Part No. or size
Air Valve Spring .	*16–48U
Needle valve complete	†#8
Accel. Pump Cross Passage	‡#50
Accel. Pump Cylinder . . .	S–1198–C

*The dimensions of the air valve springs are as follows No of coils 10½; length 2⅝" to 3⅛", wire gauge 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #50 passage is the same size as a #50 wire drill The size of the passage is stamped on the side of the body of the passage.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
GRAHAM-PAIGE					CARTER
1928	610	Own	6	2⅛"x4½"	DRJHO8-1⅛"
					JOHNSON
1928	610	Own	6	2⅛"x4½"	H 1"
1928	619	Own	6	3½"x5 "	R 1¾"
1928	629	Own	6	3½"x5 "	R 1¾"
1928	835	Own	8	3⅜"x4½"	R 1¾"
1929	612	Own	6	3 "x4½"	H 1¼"
1929	615	Own	6	3¼"x4½"	R 1½"
1929	621	Own	6	3½"x5 "	R 1¾"
1929	827, 837	Own	8	3⅜"x4½"	R 1¾"
					DET. LUB.
1930	Std 6	Own	6	3⅛"x4½"	1¼"
1930	Spec 6	Own	6	3¼"x4½"	1½"
1930	St & Spec 8	Own	8	3¼"x4½"	1¾"
1930	Custom 8	Own	8	3⅜"x4½"	1¾"
					SCHEBLER
1928	614	Own	6	3⅛"x4½"	S 1½"

Complete carburetor adjustment information for all carburetors used on Graham-Paige automobiles will be found in the following paragraphs.

If trouble is experienced in obtaining a correct carburetor adjustment after all tune-up recommendations have been checked, turn to the Carburetor Specification Diagnosis section for more information.

CARTER CARBURETORS

Two adjustments are provided on Carter Carburetors Model DRJHO-8 used on Graham-Paige. One, the idle adjustment shown in Fig. 5, is located in the side of the throat of the carburetor and regulates the gasoline mixture at idling speeds. The other, the high speed adjustment shown in Fig. 12, regulates the gasoline mixture at high speeds.

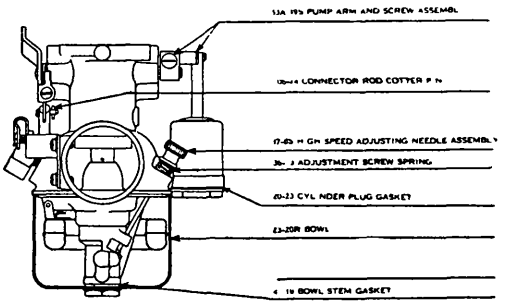


Fig. 12

View of Carter carburetor Model DRJHO-8 used on Graham-Paige automobiles. This carburetor is equipped with high speed and idling speed adjusting screws. The high speed adjusting screw is shown in the illustration above. The idle adjusting screw is shown in Fig. 5.

Idle Adjustment.—Open the idle adjustment screw ¾ to 1¼ turn, Fig. 5, until the engine hits evenly without loading or missing. Turning this screw in gives a richer mixture.

Idle engine speed is regulated by the throttle lever adjusting screw. This screw acts as a stop for the throttle lever and prevents the throttle valve from closing too tightly and allowing the engine to die when the accelerator is released. With the hand throttle on the steering wheel closed, set the throttle lever adjusting screw so that the engine will run 300 revolutions per minute. If the engine runs too fast, back the adjusting screw out. If the engine runs too slow, turn the adjusting screw in until the proper speed is obtained.

High Speed Adjustment.—After the idle speed adjustment has been properly made, set the high speed adjustment as follows: Back out the high speed adjusting needle 7/8 to 1 3/8 turns from its closed position. Set the adjustment so that the motor will accelerate without spitting or loading. Best results in most engine performance and economy are obtained with the mixture set as rich as possible. Screwing the high speed adjustment screw out richens the mixture.

JOHNSON CARBURETORS

The adjustment procedure for both Johnson Model H and Model R carburetors used on Graham-Paige automobiles is practically the same with the exception that on the Model H carburetor the high speed adjustment is located on the side of the bowl while on the Model R carburetor the high speed adjustment is located at the bottom of the bowl. Cut illustrating the locations of the high and low speed adjustments for Model H and Model R carburetors will be found on page 189 Fig. 6 and page 191 Fig. 10 respectively.

High Speed Adjustment.—After the motor has been thoroughly warmed up set the hand throttle so that the motor is running at approximately 30 miles per hour. Screw in the high speed adjustment until the motor runs rough from a lean mixture and then back off the adjustment until the motor just smooths out.

Next gradually retard the throttle until the motor slows down to approximately 20 miles per hour and with the motor running at this speed, make the idle adjustment.

Idle Adjustment.—On Graham-Paige automobiles equipped with Model H carburetors the idle adjustment should be made with the motor running at idling speed. However, on the models equipped with the larger type Model R carburetor having a third adjustment on the air valve the idle adjustment should be made at a motor speed of approximately 20 miles per hour.

To make an idle adjustment on cars equipped with Model H carburetors retard the throttle until the motor runs at idling speed. Screw the idle adjustment out until the motor runs rough from a lean mixture. Then screw the air valve adjustment in until the motor just smooths out. This adjustment should be made with the stop screw on the throttle valve set at a point where the motor will not die. After the idling adjustment is complete, reset the throttle stop screw to the desired idling speed.

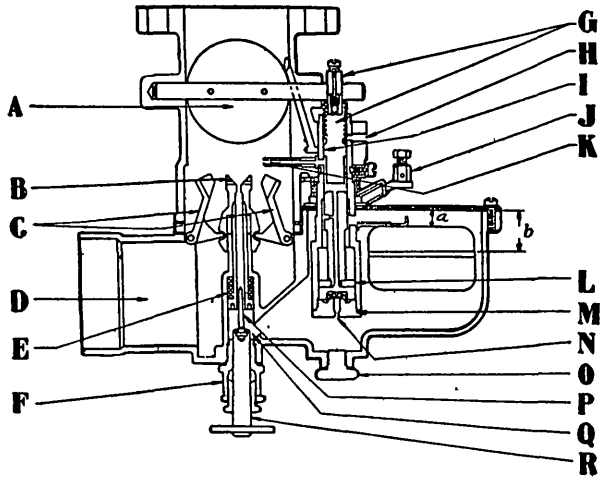


Fig. 13

Cross sectional view of Detroit Lubricator carburetor used on 1930 models of Graham-Paige. (A) throttle plate; (B) jet or aspirating tube; (C) automatic vanes; (D) air intake; (E) dash pot spring; (F) metering pin assembly; (G) rack and pinion; (H) air bleed hole; (I) primer opening; (J) choke control lever; (K) accelerating pump discharge jet; (L) accelerating pump; (M) accelerating pump check valve assembly; (N) accelerating pump feed jet; (O) carburetor drain plug; (P) metering pin; (Q) gasoline passage; (R) metering pin adjusting screw.

To make an idle adjustment on cars equipped with Model R carburetors having a third adjustment on the air valve, set the throttle so that the motor runs at approximately 20 miles per hour. Screw the idle adjustment out until the motor runs rough or surges due to a rich mixture, then screw the air valve adjusting screw in until the motor just smooths out. Next take the car out on the road and test for correct motor performance. If the motor performs properly at speeds above idling, then retard the throttle until the motor is running at idling speed.

The third adjustment is provided to prevent the motor from loading at idling speeds. This adjustment is generally located between the throat of the carburetor and the air cleaner and is for the purpose of preventing the air valve closing completely. After the third adjustment has been made, again road test the car.

DETROIT LUBRICATOR CARBURETORS

Principle of Operation

Detroit Lubricator carburetors come as equipment on 1930 Graham-Paige automobiles. This carburetor operates on what is usually termed the expanding principle. Air enters the intake at (D) Fig. 13 and passes between the vanes (C) and mixes with the gasoline which is discharged from the jet (B). The vanes move from a nearly closed position at idle to wide open as the speed increases. As the vanes open, the gasoline metering orifice is raised on the metering pin (P) and since the metering pin is tapered, the orifice is enlarged as the vanes open.

Gasoline enters the carburetor at (X) Fig. 14 and flows through the screen and needle valve into the float chamber. The gasoline then flows through the passage (Q) Fig. 13 to the metering orifice where it is metered on the tapered pin (P). From this orifice it passes through the jet or aspirating tube (B), where it is thoroughly mixed with the air stream. The mixture then passes into the manifold past the throttle plate (A). This gives complete control of the metering of the part throttle range.

For maximum power at any speed, additional fuel is required which must be added to the part throttle mixture for wide open throttle performance. As the extra fuel is not used on part throttle operation a leaner mixture is obtained when the power is not in demand. This provides an economizer action. To secure this action when the throttle is open more than one-half way, the pump plunger which is directly connected to the throttle by means of a rack and pinion (G) Fig. 13 closes the air bleed hole (H) and the power well begins to flow at (K) making the mixture richer. The power well and accelerating pump are fed from the jet (N).

For a quick opening of the throttle at any speed, it is necessary to provide a richer mixture of gasoline and air to give fast and uniform acceleration. This is accomplished by an accelerating pump (L) Fig. 13 on the lower end of the plunger which is connected to the throttle by the rack and pinion (G). As the throttle is opened, the plunger in the pump displaces the fuel in the pump chamber and the accelerating fuel is discharged into the air stream at (K). The check valve assembly (M) in the bottom of the pump prevents fuel from being forced back into the float chamber instead of into the air stream.

The presence of dirt or grit on this valve seat may cause leaks reducing the accelerating charge so that a lean spot (flat spot or bump) may result when the throttle is opened quickly. This may be easily remedied by removing the check valve assembly and blowing it out with compressed air.

For starting in cold weather, the carburetor choke control lever is pulled around to the extreme position. This permits the primer opening in the pump housing to register with the primer opening (I) in the throttle body. When the engine is cranked, gasoline is drawn in above the throttle plate (A) on the high vacuum side of the throttle and from there into the manifold.

An automatic throttle control for starting is provided at (Y) Fig. 14. This is accomplished by the throttle kicker screw (S) located in the gear of the throttle shaft riding on a flat on the pump housing. This flat when rotated by movement of the carburetor choke control lever (J) Fig. 13 provides a cam action which opens the throttle the required amount. The throttle kicker screw should be set approximately flush or so that it just contacts with the flat on the pump housing (Y) Fig. 13. This eliminates any necessity of opening the throttle when starting by means of the throttle control hand lever at the steering wheel.

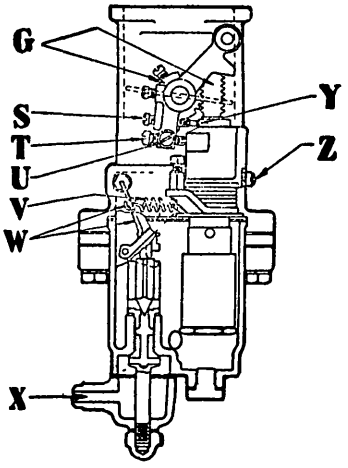


Fig. 14

Cross sectional end view of Detroit Lubricator carburetor used on 1930 models of Graham-Paige. (G) rack and pinion, (S) throttle kicker screw; (T) throttle adjusting screw; (U) throttle adjusting lock screw; (V) vane spring; (W) hold down wire, (X) gasoline intake; (Y) pump housing; (Z) pump retaining screw.

As an aid to the control of the motor during the warming up period, an additional spring load is applied on the vanes (C) by means of an external spring (V) attached to the choking and warming up lever (J) Fig. 13, and working through the hold down wire (W) Fig. 14. This increases the velocity of the air past the jet (B) Fig. 13 and the discharge tube (K) so that the warming up fuel is more fully atomized and therefore more combustible. The spring (E) in the dash pot chamber assists in closing the vanes rapidly on deceleration. The length of this spring should not be changed under any circumstances.

To drain water from the carburetor, a drain plug (O) Fig. 13 is provided but in extreme cases remove the entire metering pin assembly (F) and also the gasoline strainers.

Carburetor Adjustment

If it should be necessary to readjust the carburetor for any reason, start the engine and allow it to warm up to normal running temperature. With the spark retarded and the throttle closed, loosen lock screw (U) Fig. 14 and move the throttle adjusting screw (T) in (to increase engine speed) or out (to reduce engine speed) until the engine will idle at approximately five miles per hour.

If the metering pin (R) Fig. 13 requires adjusting, turn it slowly to the right (in) until the engine begins to miss (mixture too lean); then turn slowly to the left (out) until the engine fires evenly on all cylinders. This is the only adjustment on the carburetor and regulates the gasoline air ratio throughout the entire range. When idle is properly set, the carburetor is set for maximum performance of the engine.

SCHEBLER CARBURETORS

Graham-Paige 1928 Models came equipped with Schebler Model S-1½" carburetors. If trouble is experienced in obtaining a carburetor adjustment, check to see that the air valve spring is not weak or defective; also that the air valve is not sticking due to a worn needle valve lift lever.

Complete adjustment information for Schebler Model S carburetors will be found in the Schebler section in the back of this book.

Hudson 1925-30

Motor Tune-Up

It will generally be found when a Hudson automobile is brought in for a motor tune-up that someone has tampered with either the ignition timing, spark plug point setting or contact point adjustment. On eight cylinder models, special care should be exercised when synchronizing the contact points. The symptoms produced by improper synchronization of the contact points should not be confused with carburetor trouble.

For those models of Hudson equipped with Stewart carburetors, observe the special information closely contained in the paragraphs following the Tune-Up Operations, below.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: When adjusting the timing chain, special care should be exercised not to damage the gasket between the eccentric assemblies on the engine case. If this gasket is damaged, an oil leak will occur. (See Timing Chain Adjustment).
3. Check ignition timing; adjust if necessary.
4. Synchronize distributor points.
   Note: Double breaker arm distributors are used only on eight cylinder models.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan belt; adjust if necessary.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Check throttle valve opening.
10. Check choke valve for position.
11. Check manifold gasket; see that all manifold flange nuts are tight.
    Note: If necessary to replace the old manifold gasket with new one, this operation is not included in the motor tune-up and an extra charge should be made.
12. Adjust carburetor; clean if necessary.
    Note: If difficulty is experienced in obtaining the correct carburetor adjustment on either Marvel or Stewart equipment, check to see that the air valve is working properly. On Marvel carburetors, faulty air valve action will generally be found to be the result of a weak air valve spring. On Stewart carburetors, faulty air valve action is generally caused by sticking of the dash pot piston which controls the action of the air valve or aspirating valve assembly.
13. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load condition.

Ragged Idle

Ignition Timing and Distributor Points.—Of all the motor tune-up operations for Hudson automobiles, the most critical is ignition timing, spark plug and contact point settings. If the points are not properly cleaned and adjusted, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds.

Ignition Timing not Properly Synchronized.—A condition of poor idle may be caused by distributor points that are not properly synchronized on Hudson eight cylinder models only. If the mechanic is not familiar with a Hudson automobile, care should be exercised not to confuse this trouble with carburetor trouble. The symptoms when the points are not properly synchronized are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds. To correct this condition, synchronize the points as described under Ignition Timing.

Carburetor Air Valve (Stewart Carburetors).—A lean mixture that will prevent a correct idling condition may be caused by dirt or grit between the dash pot piston on cylinder wall thus causing the air valve to stick in the open position. If the trouble is not exaggerated enough to cause the air valve to stick open but just retards its free action, trouble will probably be experienced at all motor speeds. The air valve sticking open may also cause a condition of hard starting.

To determine whether the air valve is stuck in the open position, pull out carburetor choke and crank the motor. If a pronounced sucking noise is heard, the air valve is not stuck open. However, if a sucking noise is not heard, the air valve will be found to be in the open position. If the air valve is stuck in the open position, a few sharp raps on the carburetor body will generally cause it to settle into position.

To correct a condition of a sticking air valve, remove the carburetor from the car and clean thoroughly. Polish the air valve with any good grade of metal polish. Do not use sandpaper or any rough abrasive under any consideration.

Bent Carburetor Metering Pin (Stewart Carburetors).—A bent carburetor metering pin may cause the air valve to stick and result in a poor idling condition. This trouble is usually the result of careless handling in assembling or dismantling the carburetor.

To correct, replace the bent metering pin with a new one.

Pinion Gland Shaft Too Tight (Stewart Carburetors).—A poor idling condition may be the result of a rich mixture caused by a pinion gland that is too tight on the pinion shaft Fig. 4, at the bottom of the carburetor. The pinion shaft is attached rigidly through the pinion which in turn is in contact with the rack and raises and lowers

the metering pin. At the outer edge of the pinion shaft an arm is attached against which the adjusting screw operates. In order to prevent a leak around the pinion shaft, a packing gland is used. Care should be exercised when adjusting the gland nut to see that the nut is not tightened sufficiently to cause the shaft to bind and thus prevent the hand regulated bell crank from coming to rest against the adjusting screw when the dash control button is pushed in. To correct this condition, loosen the gland nut.

Carburetor Dash Control Wire too Short (Stewart Carburetors).—A poor idling condition may be the result of a rich mixture caused by a dash control wire that is too short. Make sure that the control wire is long enough to force the hand regulated bell crank attached to the pinion shaft at the bottom of the carburetor firmly against the adjusting screw when the control button on the dash is pushed in all the way.

Air Valve Piston Sticking (Marvel Carburetors).—A condition of poor idle may be caused by the air valve piston sticking on cars equipped with Marvel carburetors. This air valve piston is located directly under the air valve adjusting screw and operates against the air valve spring. The trouble is generally indicated by the fact that it is difficult to obtain a correct adjustment; also, movement of the air valve adjusting screw does not have the proper effect on the air valve action.

To correct, dismantle the carburetor and recondition the air valve piston cylinder by the use of a special reamer. The clearance between the piston and the cylinder wall should not exceed .006". (See Specification Diagnosis Section).

Poor Acceleration

Air Valve Failure (Marvel Carburetors).—A decided flat spot on acceleration may be caused by a weak air valve spring. The trouble is generally indicated by the fact that the air valve screw must be screwed in an excessive amount. To correct this trouble, replace the air valve spring. (See Carburetor Specification Diagnosis for correct air valve spring lengths).

Accelerating Pump.—A condition of poor acceleration on Hudson cars equipped with Marvel carburetors may be caused by the accelerating pump sticking or by the connecting link pin that connects the actuating arm with the pump plunger rod working out. When this pin is lost, there is no action of the accelerating pump when the throttle valve is suddenly opened. To correct a condition of accelerating pump failure due to the plunger sticking, dismantle the carburetor and thoroughly clean.

Motor Cuts Out on Pull

Spark Plug Gap Clearance.—The spark plug point clearance for Hudson automobiles should not be set less than .022" nor more than .025". Setting the spark plug points at less than .022" may not affect the motor at idling speeds but will affect its operation at high speeds and on a pull. A too close spark plug point setting will cause a decided loss in power. If the spark plug gaps are set too wide, the motor will cut out at high speeds and on a pull. The above information applies especially to Hudson motors equipped with high compression heads. On earlier models from 1925 to 1927 having lower compression heads, a spark plug setting of from .027" to .030" is permissible.

Low Gasoline Mileage

If the customer complains of low gasoline mileage, a thorough check of all tune-up operations should be made. Use special care when checking the ignition timing, spark plug and contact point settings. Also see that the carburetor is correctly and properly adjusted (see Carburetor Adjustment section).

Heat Control Valve.—Low gasoline mileage may be caused by improper setting of the heat control valve especially in cold climates. All heat control valves should be properly adjusted and work freely.

Gasoline Leaks

Float Level Adjustment.—Trouble may be experienced in some localities with gasoline leaks caused by incorrect float level setting. A standard setting for all carburetors is used at the factory but in some localities where different specific gravities of fuels are used it may be necessary to slightly change the float level adjustment. This trouble should not be confused with leaky needle valve seat.

If the float level adjustment is too high, lower it; if too low; raise it. (See float levels in Carburetor Specification section).

OIL PRESSURE

Model and Year	Min.	Max.
Super-Six 1925	3 lbs.	5 lbs.
Super-Six 1926	3 lbs.	5 lbs.
Super-Six 1927 ..	3 lbs.	5 lbs.
Super-Six 1928 ..	3 lbs.	5 lbs.
Super-Six 1929 ..	3 lbs.	5 lbs.
Great Eight 1930 ...	3 lbs.	5 lbs.

IGNITION TIMING

To obtain the best results when timing the spark to the motor carefully observe the correct spark plug and contact point clearance; also the firing order given for each model in the Ignition Timing table.

Hudson Super-Six 1925-26.—With spark lever in fully advanced position the breaker contacts should just begin to separate when the flywheel is 7° before top dead center or when the flywheel mark "A" is opposite the indicator mark on the flywheel housing with No. 1 piston on the compression stroke.

Ignition Timing Table

The following table contains complete ignition timing information for Hudson from 1925 to 1930 inclusive. The 1930 models are equipped with automatic spark advance.

YEAR	MODEL	IGNITION TIMING			PLUG GAP	FIRING ORDER
		Con Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
HUDSON 1925	Super-Six	020"-022"	*7° B	Adv.	028"-030"	1-5-3-6-2-4
1926	Super-Six	020"-022"	*7° B	Adv.	028"-030"	1-5-3-6-2-4
1927	F.H. Super-Six	020"-022"	T.C.	Adv	026"-028"	1-5-3-6-2-4
1928	F.H. Super-Six	018"-020"	3 teeth B	Adv.	022"-025"	1-5-3-6-2-4
1929	F.H. Super-Six	018"-020"	3 teeth B	Adv	022"-025"	1-5-3-6-2-4
1930	Great Eight	018"-020"	T C.	Automatic	022"-025"	1-6-2-5-8-3-7-4

Adv —Spark lever fully advanced. B —Before top dead center.
T C —Top dead center
*The ignition timing mark "A" on the flywheel is 7 degrees B T C.

Hudson Super-Six 1927.—With spark lever fully advanced the breaker contacts should just start to separate when No. 1 piston, entering compression stroke is at top dead center. The flywheel mark indicating top dead center of pistons Nos. 1 and 6 should be opposite the pointer at the peephole in the flywheel housing.

Hudson Super-Six 1928-29.—With spark lever fully advanced the contact points should just start to separate when No. 1 piston is approaching top dead center compression stroke and the flywheel mark D.C. 1-6 is three flywheel teeth before the pointer at the peephole in the flywheel housing.

Hudson Great Eight 1930.—The distributor used on Hudson Great Eight 1930 models has a double breaker arm assembly and a four lobe cam. One set of points is mounted in a fixed position and furnishes ignition for cylinders 1-2-8-7; the other set is mounted on an adjustable base and supplies ignition for cylinders 6-5-3-4. Each set of points must be timed separately and synchronized so that they break contact 45° of distributor travel apart. (For synchronizing procedure see information below).

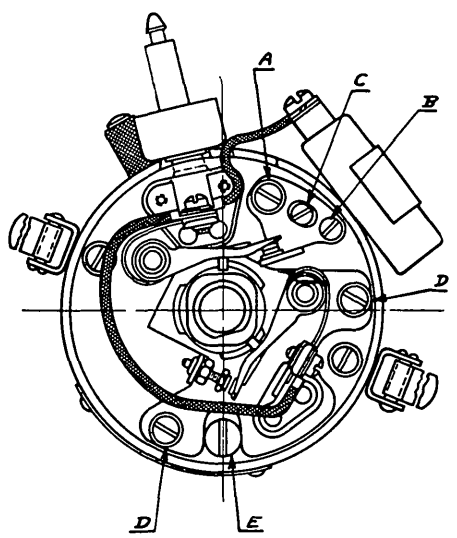


Fig. 1

Top view of Auto-Lite IGH distributor used on Hudson automobiles showing the location of the stationary and adjustable contacts. These contact arms are set to break 45 degrees of distributor travel apart which is equivalent to 90 degrees of flywheel travel.

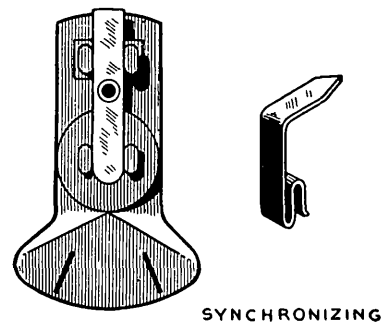


Fig. 2

View of distributor rotor and synchronizing tool for Auto-Lite IGH distributor used on Hudson automobiles. Note that the fan tail of the distributor has two marks on it which are for the purpose of synchronizing the distributor points.

To time the distributor to the motor, crank the engine until No. 1 piston is at T.D.C. of the compression stroke and the flywheel mark UPDC 1-8 registers with the pointer of the peephole in the flywheel housing. Locate the distributor so that the stationary set of points just start to break contact with the rotor under No. 1 spark plug terminal.

Motors using anti-knock gasoline should be timed so that the spark occurs 7/8" ahead of top dead center.

To synchronize 8 cylinder distributors with four lobe cams (Auto-Lite IGH distributor).—On Auto-Lite IGH distributors one set of points is carried on the main breaker plate assembly and the other set is carried on a sub plate mounted on the main plate. To synchronize, first adjust both sets of points to the proper clearance (see Ignition Timing Table). The fixed breaker points are adjustable for gap openings by loosening the lock screw (A) Fig. 1 and the pivot screw (B) and adjusting with eccentric screw (C). After obtaining the correct gap, be sure both screws (A) and (B) are tight. Adjustment of the gap for the sub plate breaker points is made by the conventional screw point and lock nut.

To synchronize the two sets of points, first insulate the sub plate points from each other by placing a thin piece of fibre between them. Then crank the engine until the breaker points just open. This can be indicated by a timing light connected across the breaker arm and to ground. The points should be adjusted so that the timing light will light when the breaker cam backlash is turned in the direction of drive and go out when the backlash is turned against rotation.

On the top of the fan tail of the rotor will be found two timing marks 45 degrees apart (left view Fig. 2). With the rotor backlash taken up in the direction of drive place the synchronizing gauge (right view Fig. 2) on the edge of the distributor base so that the point is exactly in alignment with the clockwise line or right hand rotation

distributors, or with the counter-clockwise line for left hand distributors. Next crank the engine until the other timing line on the distributor rotor is exactly in alignment with the point of the synchronizing gauge. Make sure that any backlash in the rotor is taken up in the direction of drive.

With the distributor rotor in this position, the sub plate point should be adjusted so that the timing light will light when the breaker cam backlash is turned in the direction of drive and go out when the backlash is turned against rotation Before this test can be made the fibre between the sub plate points should be removed and inserted between the other set of points.

The sub plate points can be adjusted by loosening the two lock screws (D) Fig. 1 and rotating the sub plates with the eccentric screw (E) until the proper setting is obtained.

After synchronizing the two sets of points, turn the engine over a few times and recheck to be sure the exact setting has been obtained.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for Hudson from 1925 to 1930 inclusive. Valve tappet adjustments are for hot motors unless otherwise specified.

YEAR	MODEL	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int Valve	Exh Valve
		Int.	Exh	Int	Exh				
HUDSON									
1925	Super-Six	004″		004″	005″	7°A		Opens	
1926	Super-Six	004″		004″	006″	7°A		Opens	
1927	F H Super-Six	004″		004″–006″	006″–008″	7°A		Opens	
1928	F H Super-Six	004″		004″–006″	006″–008″	7°A		Opens	
1929	F H Super-Six	004″		004″–006″	006″–008″	7°A		Opens	
1930	Great Eight	004″		003″–005″	005″–007″		071″A	Opens	

A.—After top dead center

Hudson Super Six 1925-29.—To check the valve timing, set the tappet clearance of No. 1 intake valve at .004″. Intake valve should start to open when the flywheel mark indicating T.D.C. for pistons Nos. 1 and 6 is between two and three flywheel teeth past the pointer of the peephole in the flywheel housing. (See Valve Timing Table for tappet clearance).

"F" Head motors in models from 1927 to 1929 may be encountered where the intake valve does not open until the D.C. mark is five flywheel teeth past the indicator. In this event the timing should not be changed unless the car performance warrants it as this setting has proved most satisfactory with some motors.

Hudson Great Eight 1930.—To check the valve timing, set the tappet clearance of No. 1 intake valve at .004″. Inlet valve should just start to open when No. 1 piston is .071″ past T.D.C. of the exhaust stroke. If checking by flywheel travel, No. 1 intake valve should just start to open when the flywheel mark D.C. 1-8 is approximately two flywheel teeth past the indicator.

CHAIN ADJUSTMENT

Hudson All Models 1925-30.—Slack in the timing chain is removed by means of an eccentric adjustment built into the distributor drive gear housing. To adjust the timing chain, loosen the three bolts that secure the distributor drive gear housing to the timing case and turn the notched adjusting nut so that the top moves away from the motor. When the chain is properly adjusted, there should be ⅛″ movement on the generator drive coupling when rotating with the fingers.

A point may be reached in the adjustment of the timing chain at which the inside top and lower support bolts will interfere with the movement of the adjusting nut. When this happens, remove the bolts, make the adjustment and allow the bolts to pass through a notch in the adjusting nut. Care should be exercised not to damage the gasket between the eccentric housing and the timing chain case. To avoid damaging the gasket, the housing flange should be forced away from the housing just far enough to clear the gasket before the adjustment is made.

GAS LINE SCREENS

All models of Hudson from 1925 to 1930 inclusive are equipped with vacuum tank fuel feed and have two strainer screens in the gas lines. One strainer screen is located in the top of the vacuum tank (A) Fig. 3 and the other is located at the carburetor. On some models, there was also a sediment bowl at the bottom of the vacuum tank which should be removed and cleaned at intervals. To clean the gas line screens, in the head of the vacuum tank, disconnect the feed line from the gasoline tank and remove the hexagon bushing The strainer screen can then be removed and washed in gasoline and blown free with air.

On those models having a glass sediment bowl at the bottom of the vacuum tank the gasoline flow will be automatically shut off as soon as the glass bowl is removed.

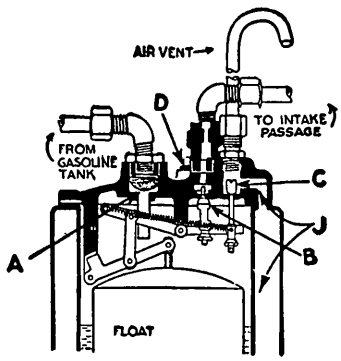


Fig. 3

Upper half of vacuum tank showing position of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

When cleaning the strainer screen at the carburetor the strainer screen body should be thoroughly washed out and blown dry with air.

Carburetor Specifications

FLOAT LEVEL

Two makes of carburetors have been used on Hudson automobiles from 1925 to 1930 inclusive. Early models were equipped with Stewart carburetors. The later 1927 to 1930 models are equipped with Marvel carburetors.

Stewart Carburetors

On the early models equipped with Stewart carburetors, very little difficulty was experienced with float level adjustment. If the float level changed in service, check for worn counterweight levers. The constant contact of the counterweight levers against the top of the float will cause them to wear, after a long period of service, to a point where the gasoline height in the float bowl may be changed. When trouble is encountered with this condition, the float needle assembly may be removed by removing the float bowl cover. Remove the pins holding the counterweight levers in place and reverse the counterweight levers. If both sides of the counterweight levers are worn, replace the levers with new parts.

Marvel Carburetors

The float level adjustment is the same for all models of Marvel carburetor used on Hudson from 1925 to 1930 inclusive. The fuel level in the float bowl will be correct when the float is in a parallel position with the carburetor body flange when the float needle is seated.

It may be necessary in some localities where different specific gravities of fuels are used to slightly alter the float level setting. This condition will generally be indicated by a slight leak. However, care should be exercised not to confuse a condition of leaky float valves with wrong float level height.

CARBURETOR SPECIFICATION DIAGNOSIS

Early model Hudson cars were equipped with Stewart carburetors while late models are equipped with Marvel carburetors. On those models equipped with Stewart carburetors, all fuel adjustment changes are made through manual or automatic adjustment so that the specification diagnosis information consists mainly of a thorough inspection for wear of all parts when trouble is experienced.

On later models equipped with Marvel carburetors, jet specifications are determined by flow meter measurement. These carburetors are correctly calibrated at the factory and are not easily changed. The specification diagnosis consists mainly of inspecting parts for wear.

STEWART CARBURETORS

On Stewart carburetors, the desired fuel metering effect is accomplished by extending the lower end of the main nozzle (A) down over a tapered pin (J) Fig. 4. The fuel nozzle is mounted in and

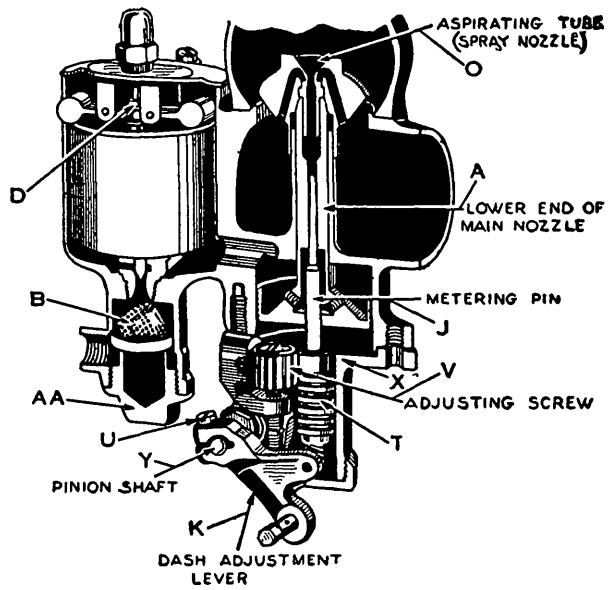


Fig 4

Cross sectional view of Stewart carburetor used on Hudson automobiles. Only one adjusting screw is provided on this carburetor as shown at (V) This adjusting screw controls the height of the metering pin (I) through the medium of the dash adjusting lever (K).

moves with the air valve; therefore, as the valve lifts, the size opening at the metering point is gradually increased so as to admit an increased amount of fuel with the increased opening of the air valve.

Very little trouble is experienced with this construction other than dirt or worn parts. In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle and inspect as follows:

Air Valve.—The air valve should work freely in the air valve guide (air valve assembly is shown in Fig. 4). If the valve sticks in the guide, the motor will be hard to start and will not idle properly. Sticking in the guide is most generally caused by dirt or grit

To correct this trouble, dismantle the carburetor, clean all passageways and openings and polish the guide with metal polish. Never use abrasive compounds for this purpose.

Metering Pin.—See that the metering pin is not bent or loose in the rack. Cases may be encountered where someone unfamiliar with the proper repair procedure has dismantled the carburetor and in assembling, jammed the metering pin into the aspirating valve with such force that an attempt at adjustment may have broken the metering pin loose from its anchor in the metering pin rack. Also, the metering pin may have been bent by careless handling when assembling the carburetor. The metering pin assembly is shown at (J) Fig. 4.

To correct this trouble, in cases of emergency, if the metering pin is bent, it may be straightened but the best procedure is to replace with a new part.

Pinion Gear.—If the pinion gear is badly worn, it should be replaced with a new gear The rack and pinion are shown at (T) Fig. 4.

Also check for worn or leaky needle valve and seat.

MARVEL CARBURETORS

Two types of Marvel carburetors were used on Hudson automobiles from 1927 to 1930 inclusive. Carburetors used on 1927 and 1928 models were of the two nozzle type. While those used on 29 and 30 models were of the three nozzle type.

The carburetor construction embodies a main body or mixing chamber and a conventional float chamber bowl with fuel strainer attached at the point of entrance of the fuel to the bowl. On the two nozzle type carburetors, one nozzle, the low speed nozzle, is mounted directly under the venturi block and the other nozzle called the high speed nozzle is mounted under the air valve. On the three nozzle type, the low speed nozzle is mounted directly under the venturi block and the high speed and intermediate nozzles are mounted under the air valve. (See Fig. 9).

An air valve screw is provided which regulates the pressure of the air valve spring enclosed therein. Within this screw is also enclosed a plunger connected by a link to the air valve. The function of this plunger is to provide a resistance in addition to that of the air valve spring to assist in acceleration. This arrangement of plunger and air valve screw is termed the dash pot.

A further control of the high speed jet is provided by the economizer which is a fuel metering valve operated by the carburetor throttle. This valve provides the maximum fuel feed to the high speed nozzles when the throttle is fully opened for high speed, hill power and for quick pick-up. During the ordinary driving ranges, this valve controls the amount of fuel being used, thus providing all the economy possible. This valve is entirely automatic and requires no adjustment.

A choke button is provided on the instrument board to assist in starting. Pulling out this button closes a butterfly valve in the air intake passage of the carburetor which restricts the air opening of the carburetor and consequently produces a richer mixture. This button should be released part way at once upon starting, and fully released as soon as the engine will run without it.

A control lever is also placed on the instrument board to provide for manual regulation of heat control in addition to the automatic heat control mechanism of the carburetor.

The three jet or nozzle type carburetor introduced the first by-pass installation which carries the mixture from the low speed nozzle to a point above the throttle valve during the part choke period after starting. For more complete information, see choker and by-pass, page 203 in the Adjustment section.

Specification Diagnosis

(Marvel 2 and 3 Nozzle Carburetors)

Jet sizes for Marvel carburetors used on Hudson automobiles are determined by flow meter measurements. These carburetors are calibrated at the factory and are not intended to be changed. The specification diagnosis consists mainly of inspecting the parts for wear.

Inspection Instructions.—In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle, thoroughly clean all jets and passageways and inspect for worn parts. Do not, under any consideration, change any of the jet sizes or openings.

Air Adjusting Screw: Inside of screw should be smooth. Clearance between plunger and shell should not exceed .006". Cases may be encountered in service where the air valve plunger sticks in the air valve screw due to the fact that there is not sufficient clearance between the plunger and screw. When this trouble occurs, the air valve screw should be reamed out with a special stub reamer .928" in diameter as shown in Fig. 5. Extreme care should be exercised when reaming out the air valve adjustment screw not to get the clearance too great between the inner surface of the screw and the air valve plunger.

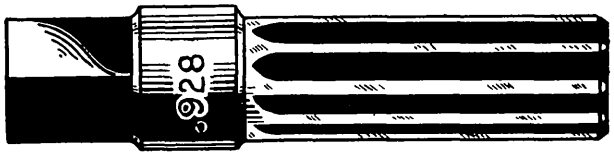


Fig. 5

Special stub reamer used to ream out air valve adjusting screws as used on Marvel carburetors for Hudson automobiles. Care should be exercised when reaming out the adjusting screw that the clearance between the inner surface of the screw and the air valve plunger does not exceed .006".

Air Valve Spring Specifications: If the air valve spring is made with a number of closed coils at the center section and is zinc plated, it should have a free length of 1½". If the air valve spring is made without a number of closed coils at the center, it should have a free length of 1 1/16". (See information below under Air Valve Spring).

Air Valve: The air valve should be free on its shaft but have very little play. Contact of the valve against the carburetor body should show contact for the entire curved portion.

Air Valve Spring (Marvel 2 and 3 nozzle carburetors).—The following diagnosis information is intended only to enable the mechanic to determine whether or not the carburetor calibration parts have been tampered with or changed in any way and under no consideration should jet openings, passageways or air valve springs be changed.

The air valve spring is located in the air valve adjusting screw between the head of the air valve plunger and the adjusting screw. The air valve spring is a calibrated part, the purpose of which is to control the action of the air valve through the full range of operation of the carburetor.

Diagnosis, Air Valve Spring Weak or too Short.—If the air valve spring is weak or too short, the car owner will probably complain of a poor idling condition and that the motor has no power or pick-up. The idle adjustment should be approximately correct when the head of the adjusting screw is flush with the ratchet spring and if it should be necessary in order to make the car idle properly to screw the adjusting screw in an excessive amount, the air valve spring will probably be found to be weak.

On the other hand, if someone has stretched the air valve spring or has replaced it with a spring of the wrong dimension, the car may idle properly but hesitate and Roll at speeds and on acceleration.

Do not, under any consideration, attempt to correct a condition caused by a weak air valve spring by stretching the spring. These springs are especially constructed to deliver a certain amount of resistance to the air valve plunger at various speeds and if the original spring is stretched or distorted in any way, it will not work properly and will throw the carburetor out of balance.

Main Discharge Jet (Marvel 2 and 3 nozzle carburetors).—The following diagnosis information is intended only to enable the mechanic to determine whether or not the carburetor calibration specifications have been changed or tampered with in any way.

The main discharge nozzle or low speed nozzle is mounted under the venturi block and furnishes fuel to the motor at idling and low speeds.

Diagnosis, Low Speed Nozzle too Small.—A low speed nozzle that is too small will cause the motor to hunt or run rough from a lean mixture. To check out this condition, start with the air valve screw set flush with the ratchet spring. That is, the end or head of the air valve adjusting screw should be just even with the end of the ratchet spring. Next, screw the air valve screw in one turn. If the motor still runs rough, the main discharge jet is probably too small. When the carburetor is properly adjusted, the air valve just hangs off its seat and screwing the air valve adjusting screw in one full turn pushes the air valve over against the wall of the carburetor. This shuts off the air and has a tendency to draw more gasoline from the main jet.

Caution: Before changing the jet to a larger size, make sure that the nozzle opening is not plugged up with dirt. Never change a nozzle size by drilling.

Diagnosis, Low Speed Nozzle too Large.—A low speed nozzle that is too large will generally cause the motor to Roll and load. To check for a low speed nozzle that is too large, set the head of the air valve adjusting screw flush with the end of the ratchet spring. Next, screw the air valve screw out one full turn from this position. If the motor has a tendency to smooth out, the low speed nozzle may be too large, but in extreme cases the motor may still Roll and load even after the spring tension has been relieved.

In either case whether the main discharge jet is too large or too small, the motor may have a tendency to die after acceleration.

High Speed Jet (Marvel 2 and 3 jet carburetors).—The function of the high speed and intermediate jets located under the air valve is to supply fuel to the motor at high speeds in conjunction with the low speed jet mounted under the venturi block. The action of the high and intermediate jet is controlled by the automatic air valve and the fuel metering valve which is operated by the carburetor throttle. The metering valve provides the maximum fuel feed to the high speed nozzle when the throttle is fully open for high speed, hill power and for quick pick up. This valve is entirely automatic and requires no adjustment.

On three jet carburetors the two jets under the air valve are calibrated and balanced at the factory to deliver the proper amount of fuel through the full range of the carburetor. The high speed jet will generally be found to be slightly smaller than the intermediate jet, and the intermediate jet is shorter than the high speed jet. For diagnosis purposes, the high and intermediate jets may be considered as one jet.

Diagnosis, High Speed Nozzle too Small.—A high speed jet or nozzle that is too small will cause the motor to run rough at intermediate speed and lack power under full load or at high speed, generally accompanied by back-firing through the carburetor and fittings. This condition will also have a tendency to cut down the revolutions per minute of the motor under a full throttle service floor test.

Diagnosis, High Speed Nozzle too Large.—A high speed nozzle that is too large will generally be indicated by low gasoline mileage. In extreme cases where the jet is much too large, the carburetor may have a tendency to Roll and load on a hill. However, if the trouble is not exaggerated enough to cause the motor to Roll and load, the only symptoms will be low gasoline mileage. To check the trouble, try a smaller high speed nozzle.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
HUDSON					MARVEL
1927	Super Six	Own	6	3½″x5″	B 1¼″
1928	Super Six	Own	6	3½″x5″	B 1¼″
1929	Super Six	Own	6	3½″x5″	VB 1½″
1930	Great Eight	Own	8	2¾″x4½″	VB 1½″
					STEWART
1925	Super Six	Own	6	3½″x5″	CR25 1¼″
1926	Super Six	Own	6	3½″x5″	CR25 1¼″

ADJUSTMENT PRECAUTIONS

Gasoline mileage and motor performance are dependent more than ever before upon correct tune-up and carburetor adjustment. Therefore, it is suggested that the special information with reference to tune-up at the front of this section and the special adjustment information found below be closely observed.

Affect of Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds' time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Stewart Carburetors.—Carburetor adjustment on Stewart carburetors is accomplished by means of a metering pin that is raised and lowered through the medium of a pinion and rack. In practice, it is necessary sometimes in order to obtain a correct adjustment to change the relationship of the rack to the pinion. Complete information for the correct adjustment procedure when this change is necessary will be found under the heading of Stewart Carburetors in the following paragraphs:

Air Valve Failure.—On Hudson automobiles equipped with either Marvel or Stewart carburetors, difficulty may be experienced in obtaining a correct adjustment due to a failure of the air valve action.

On Stewart carburetors, this trouble may be the result of a sticky aspirating valve, Fig. 4, caused by dirt between the dash pot piston and the cylinder walls. To correct this trouble, dismantle and thoroughly clean the carburetor. A sticky air valve may also be caused by a bent metering pin, in which case the metering pin should either be trued up or replaced with a new part.

On cars equipped with Marvel carburetors, a failure of the air valve action may be the result of a weak air valve spring. This spring is located just under the air valve adjustment screw and provides the tension against which the air valve piston works. If this spring becomes weakened in service or if too short, the action of the air valve will be affected.

Never, under any consideration, should this spring be stretched. If it is found to be too short or has weakened in service, replace with a new spring of the correct dimension. (See Carburetor Specifications).

STEWART CARBURETORS

A proper adjustment cannot be obtained unless all parts of the carburetor are working properly. If difficulty is experienced in obtaining a correct carburetor adjustment, see information under Inspection Instructions in the Carburetor Specification Diagnosis section.

Adjustment.—There is but one point of adjustment (V) Fig. 4 to the carburetor. This adjustment varies the relative height of the metering pin to the opening of the aspirating tube or spray nozzle (O), when the dash control ratchet on the instrument board is in regular running position.

The tapered metering pin (J) is subject to control within fixed limit by means of the dash control button located on the instrument board for the purpose of obtaining a rich mixture for starting. Run the motor until it is thoroughly warmed; accelerate the engine by opening the throttle quickly. If a popping sound is not heard, turn the adjusting screw (V) anti-clockwise (up) until a popping sound is heard when the throttle opens quickly. After the popping sound is heard, the screw should be turned clockwise (down) a few notches at a time until the popping is just overcome. The best adjustment will usually be found at this point. It is very important when making this adjustment that the spark lever be retarded half way. In some cases it may be found necessary to remove and reset the arm on the pinion shaft (Y). If sufficient adjustment cannot be obtained by the travel of the adjusting screw, the following adjustment should be made:

Pinion Shaft and Lever Adjustment.—Ordinarily a sufficient range of adjustment can be obtained by means of the screw (V) Fig. 4. In the event, however, that the mixture cannot be made sufficiently lean by turning the screw all the way up or sufficiently rich by turning it all the way down, this condition can be overcome by shifting the pinion shaft (Y) in relation to the lever (K). To make this adjustment, first mark the present position then loosen the adjusting lever clamp screw (U) with the engine warmed up and running with retarded spark, make the adjustment by rotating the pinion shaft by the screwdriver slot in its end to the left for a lean mixture and to the right for a rich mixture. Next, tighten the adjusting arm clamp screw and make final adjustment in the regular manner with the adjusting screw (V). It is well to have the adjusting screw (V) in the center of its adjusting range while changing the position of the bell crank arm as described above.

In case the location of the adjustment arm is completely lost, it can be restored by the following method:

Resetting Hand Control Bell Crank after Carburetor Has Been Dismantled for Cleaning or Repairs.—If the carburetor has been dismantled for any reason and the hand regulator bell crank (K) Fig. 4 has been removed, reset in the following way. Turn the pinion shaft (Y) to the right until the air valve just lifts off its seat. Then turn to the left until the valve comes to rest on its seat. Continue turning to the left a very small fraction of a turn or until there is a very slight clearance between the upper end of the metering pin and its seat. With the pinion shaft in this position, install the dash adjustment lever (K). Another more accurate way to make this adjustment is as follows: Detach the carburetor from the motor and remove the throttle body or upper half by unscrewing the two cap screws that hold the upper and lower bodies together. This will expose the metering valve head, then with the adjusting arm (K) released by loosening the clamp screw (U) and the cap of the gear housing removed, the pinion shaft should be turned so that the metering pin will be forced up until it just starts to lift the air valve from its seat. Measure the distance between the end of the gear housing and the bottom of the rack which carries the metering pin and slides within the gear housing. With a steel rule, next turn the pinion shaft just enough to lower the metering pin rack down 1/16", then with the adjusting screw (V) down one half its travel, replace the dash adjustment lever (K) and clamp it

tight by means of the screw (U). This will give an approximate adjustment so that the motor can be easily started. After bringing the motor up to normal temperature, the final setting should be made by means of the adjusting screw (V).

Caution: Connect the dash control button wire to the dash adjustment lever (K) Fig. 4 so that the arm stop rests against the adjusting screw with the control button about ⅛" in off the dash. Otherwise, a rich mixture may be the result. At normal driving temperature, the button should be completely pushed in or depressed. When making a carburetor adjustment, see that the choke is fully in and that the dash adjusting lever arm rests firmly against the adjusting screw. If the choker wire prevents this, adjustment will not be effective.

MARVEL CARBURETORS

(Three Jet Type)

Choker and By-Pass.—A choke button is provided on the instrument board to assist in starting. Pulling out this button does two things in the carburetor. First, it closes a butterfly choker valve in the air inlet of carburetor which restricts the air opening and consequently produces a very rich mixture for starting. Second, through inter-connection of the choker lever and by-pass valve Fig. 6, this motion likewise opens a passage between mixing chamber, just above low speed nozzle, and the intake manifold passage, just above the throttle. Due to the higher suction existing above the throttle, the over rich starting mixture is therefore immediately drawn through the fixed opening in by-pass valve, up past the throttle and on into the engine. Partial release of choker button on instrument board after starting, releases choker valve so that it positions itself to the needs of the engine, due to the action of the compensating spring attached to choker valve, which now becomes automatic in its action, the spring allowing the valve to open or close automatically, depending on the engine speed and quantity of air passing through carburetor. This partial release of choker button does not, however, change position of by-pass valve opening, which remains open, and engine

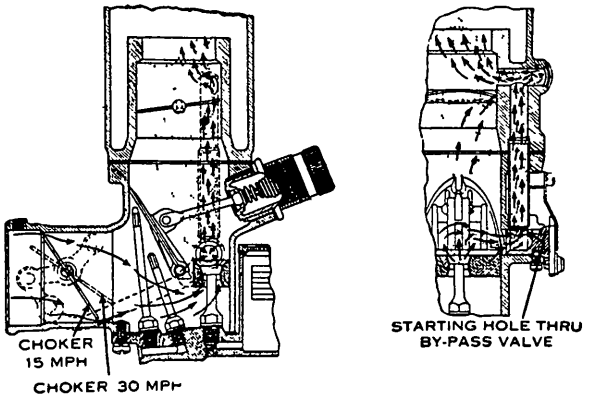


Fig. 6

Sectional view of Marvel carburetor used on Hudson automobiles showing choke valve in the fully closed position with the by-pass valve opened so that gas passes to an opening above the throttle.

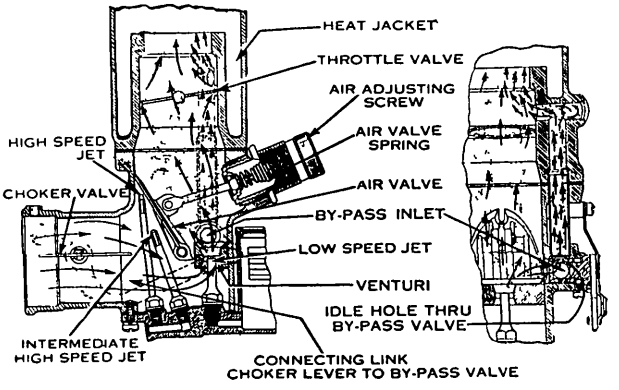


Fig. 7

Showing choker in normal open position and idle action through by-pass valve in normal running position. When the choker valve is only partially open, the by-pass valve remains in the open position thus providing a richer mixture to the intake manifold.

therefore runs at an increased idling speed during this period, same as would be obtained if the throttle were manually opened slightly and there was no by-pass valve. This gives the car a speed of approximately 14 to 15 miles per hour on the road automatically, without the necessity of opening throttle, and is of great assistance in getting under way after starting a cold engine.

Reference to Fig. 6 will show this action, and likewise the position of choker valve.

As soon as engine is sufficiently warmed up to drive with choker button completely released, by-pass valve returns to its normal position shown in Fig. 7 and choker valve is automatically locked in wide open position.

It will be noted in the figure that there is still a very small hole in by-pass valve in this position connecting to passage above throttle. This is to provide for a proportion of the idling mixture to pass above the throttle, as shown, stabilizing the idling action of the engine and insuring positive idling performance, especially in cold weather.

Some idling mixture is, however, allowed to pass in normal way past throttle, and by the regulation of this amount, by adjustment of throttle opening, the desired idling speed is obtained.

Carburetor Adjustment

Marvel 2 and 3 Jet Types.—No change should be made in the carburetor adjustment until after an inspection has been made to determine whether the trouble is in some other unit.

Set the air screw (A) Fig. 8 so that the end is flush with the end of the ratchet spring bearing against the screw. Set heat control in warm position and leave in this position while making adjustment. Pull out choker to full position and start engine in usual manner. As soon as the engine has fired, slightly release the choker at once. Run for a few moments until engine has warmed up. Next, set the air screw for good idle by either turning in to the right a little or backing out to the left as the

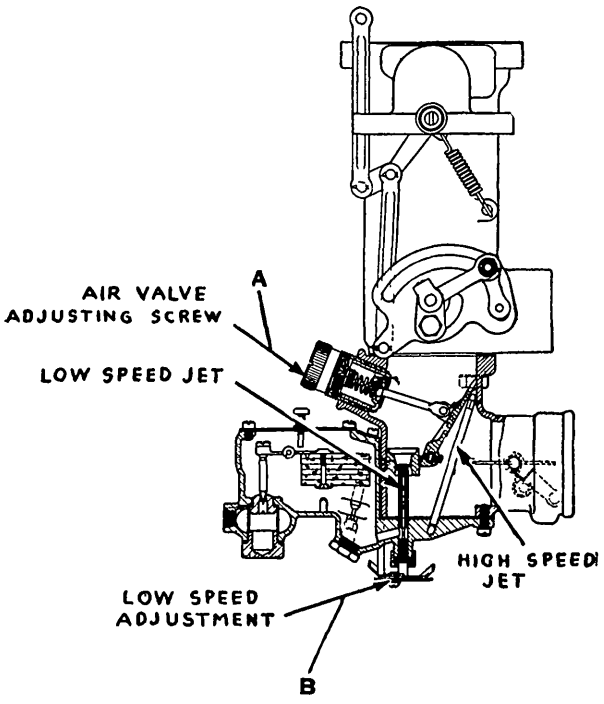


Fig. 8

Cross sectional view of two nozzle Marvel carburetor used on early Hudson automobiles showing the air valve adjusting screw (A) and the low speed adjusting screw (B).

needs of the engine require. With the engine thoroughly warmed up, the adjustment of the air screw for proper idling is easily accomplished by using a little care. If the air screw is turned in too tight, the motor will Roll or appear sluggish. If the air screw is not tight enough, the motor will hesitate and stumble and perhaps stop entirely. To make a nice clean adjustment for idle, turn the air screw back to the left until the engine hesitates indicating that the mixture has too much air and is too lean. Next, turn air screw in to the right three or four notches at a time until the engine just smooths out. When the idle adjustment is accomplished, as directed above, the proper carburetor adjustment for the entire range of the engine will have been obtained.

MANIFOLD HEAT CONTROL

(Marvel 2 and 3 Jet Types)

The carburetor and manifold have been designed to utilize the exhaust gases of the engine to insure complete vaporization and a consequent minimum consumption of fuel. This is accomplished by an exhaust jacket in the double walled riser placed between the carburetor and the intake manifold. This riser is connected to the exhaust manifold in such a manner that the exhaust gases pass between the walls of the riser through the heat jacket and the outlet to the exhaust pipe. The amount of heat thus furnished to the riser is controlled by two valves; one in the main exhaust above the exhaust outlet from the riser and one in the exhaust inlet of the riser heat jacket.

The valve in the main exhaust is connected to the throttle lever of the carburetor in such a manner that the greatest amount of heat is had in the jacket of the riser when the throttle is only partly open. As in idling and at low speeds and a decreasing amount as the throttle is opened further for higher speeds by means of the heat control lever below the instrument board this automatic action of the heat valve may be varied to suit weather and driving conditions.

The valve described above in the main exhaust line at the rear end of the engine is housed in a separate casting. On the front side of this casting will be noticed a boss acting as a locating stop for the damper valve lever. This boss indicates the closed position of the damper valve and it should be used in assembling control rod to carburetor, the normal position of the damper valve lever being against this stop boss when heat control on instrument board is set at "Hot" position and throttle is closed.

The control lever below the instrument board operates the valve in the exhaust inlet of the riser heat jacket, simultaneously with the valve in the main exhaust and an adjustment by moving control lever to "Cold" may be had to the point where no exhaust gases pass through the riser jacket thereby shutting off all the heat.

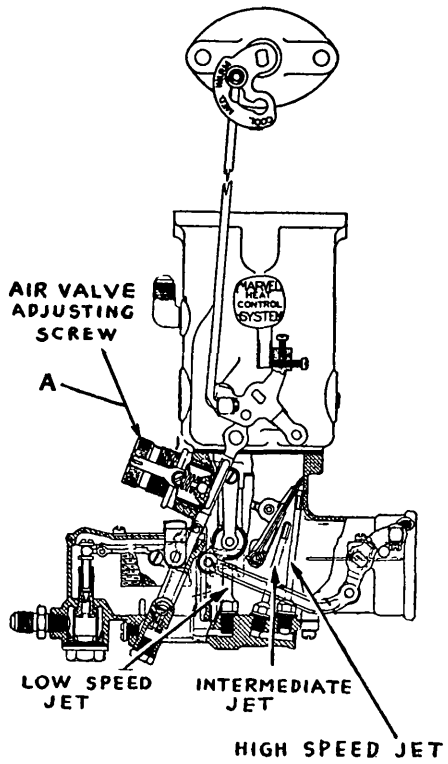


Fig. 9

Cross sectional view of three jet Marvel carburetors used on late type Hudson automobiles. This carburetor has only one adjustment which is shown at (A). The high speed and intermediate jets are located under the air valve. The low speed jet is located under the venturi block.

Hupmobile 1925-30

Motor Tune-Up

All Hupmobile motors equipped with double breaker systems are critical on ignition timing. Care should be exercised not to confuse a condition of improperly synchronized contact points with a carburetor adjustment that is too rich. The symptoms are similar and are especially noticeable at low speeds.

On cars equipped with dual carburetors if trouble is experienced at low speeds check to see that the throttle valves are properly synchronized.

Immediately following the tune-up operations will be found special information which should aid the mechanic in obtaining the most efficient engine performance.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points; synchronize contact points; oil governor weights and breaker arm pins.
2. Check timing chain for slack; adjust if necessary.
3. Check the ignition timing; adjust if necessary.
   Note: Proper results cannot be obtained if timing chain is loose; check for slack.
4. Adjust the valve tappets and free up valves.
5. Check fan belt for breaks and adjust if necessary.
   Note: If sections of the fan belt are found to be checked or split the belt should be replaced with a new one.
6. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
7. Check heat control valve.
8. Check choke valve for position.
9. Check manifold gasket; see that all manifold flange nuts are tight.
10. Check high tension wiring.
    Note: If it should become necessary to replace the wiring cut the wires of a sufficient length to avoid sharp bends and turns.
11. Clean gas line strainers and screens and clean air cleaner; also check gas lines for loose fittings.
12. Check throttle valve opening.
13. Adjust carburetor.
14. Road test car.
    Note: The ignition timing should never be advanced beyond a point of a slight ping or knock on fast acceleration or a hard pull.

Ragged Idle

Contact Points Not Properly Synchronized.—The most critical tune-up operation on eight cylinder Hupmobile motors is ignition timing, spark plug and contact point settings. A poor idling condition may be caused by incorrectly synchronized contact points which should not be confused with a too rich carburetor mixture. Check the ignition timing and synchronize the points as described in the ignition timing section.

Spark Plug Gap Clearance.—A poor idling condition may be caused by improperly adjusted spark plug points. When adjusting the spark plug points, special care should be exercised to see that all plug gaps are adjusted equally. The plug gaps should not be set to a clearance less than .022″ nor more than .025″. However, if trouble should be experienced on any particular job with a setting of .025″, try .028″.

Carburetor.—A poor idling condition may be caused by a loose main discharge jet. This trouble is generally the result of the main discharge jet loosening up and working down in the threads. If the trouble is exaggerated enough, a leaky condition that may be confused with a leaky float valve may exist and is indicated by a slow dripping of gasoline or a wet carburetor body. To correct this trouble, remove the main discharge jet plug at the bottom of the carburetor and screw the jet up tightly into place.

Another cause for a poor idling condition may be due to plugged up or dirty idling discharge jets. Where this trouble is indicated, the carburetor should be removed, all passageways and jets thoroughly washed in gasoline and blown clear with air.

Loose Butterfly Valve.—A poor idling condition may be caused by a loose butterfly valve. A loose butterfly valve may be confusing and difficult to locate due to the fact that the throttle plate moves in the shaft causing it to bind against the throat of the carburetor at times and at other times to work properly. To correct this trouble, remove the carburetor and retighten the butterfly valve.

Another condition which will cause poor idling is a warped throttle valve. When this trouble is encountered, the valve should either be replaced or trued up on a face plate.

In either case whether the throttle valve is loose or warped, care should be exercised before reassembling the carburetor to the car to see that the valve turns freely in the center of the carburetor throat.

Throttle Valve Improperly Synchronized (Stromberg DD Carburetor).—An erratic idling condition may be caused by improperly adjusted throttle valve on Stromberg DD-3 carburetors used on Hupmobile automobiles. The throttle valve in one barrel of the carburetor is rigid while the throttle valve in the other barrel of the carburetor is adjustable so that the throttle valves may be synchronized by adjusting the movable valve to the rigid valve. To synchronize the throttle valves proceed as follows. Set the throttle stop screw (5) Fig. 7 so that the motor idles at the desired speed. The movable throttle valve is controlled by screw (29) Fig. 6. Turning this screw

clockwise opens the throttle and turning it counter-clockwise closes the throttle. Adjust the movable throttle until even idling is obtained

Low Gasoline Mileage

Carburetor Fuemer.—A condition of low gasoline mileage may be caused by a gasoline leak at the fuemer Fig. 8 The leak is generally indicated by a slow dripping or wet carburetor body and can be temporarily stopped by plugging the gas line to the fumer. However, to permanently correct the trouble, it will be necessary to install a new fumer unit.

High Fuel Level.—On models equipped with a fuel pump feed, low gasoline mileage may be caused by a high fuel level as the result of a weak or leaky float valve. The fuel pump exerts 2 lbs. pressure against the valves and unless the valve is in good condition, gasoline may seep through in sufficient quantities to raise the float level or may even cause a leak. To correct this trouble, replace the float valve assembly with a new one.

Motor Misfiring

Distributor Breaker Arms.—Misfiring of the motor may be caused by a retarded action of the distributor arms due to dirt or binding of the breaker arm pins in the bearings. Keep the contact arms and contact arm pins clear and an occasional drop of light oil will help to keep the action free.

Spark Plugs.—Spark plugs have become one of the most important units in our modern motors and should be given special attention when trouble is experienced with motor misfiring or lack of power. Follow closely the recommended spark plug setting as given in the Ignition Timing Table.

On cars equipped with Atwater Kent type RA igniters the contact point clearance should be adjusted to .012". On cars equipped with Delco ignition adjust to from .022" to .027". On cars equipped with Delco-Remy ignition adjust the contact point clearance to within the limits of from .020" to 022".

OIL PRESSURE

The oil pressure data in the following table is given for hot motor when the crankcase oil is warm after the car has been driven some distance.

Model and Year	Min	Max
R-12 to R-15—1925..	3 lbs to 5 lbs.	20 lbs.
E-1—1925	3 lbs to 5 lbs	30 lbs at 30 M.P.H.
A-5—1926-27	3 lbs. to 5 lbs	30 lbs at 30 M.P.H.
E-2—1926	3 lbs. to 5 lbs.	30 lbs. at 50 M.P.H.
E-3—1927	3 lbs to 5 lbs	30 lbs at 50 M.P.H.
A-6—1928	3 lbs to 5 lbs.	30 lbs at 30 M.P.H.
E-4, M—1928	3 lbs to 5 lbs	30 lbs at 50 M.P.H.
A-7—1929	3 lbs. to 5 lbs.	30 lbs at 30 M.P H.
M—1929	3 lbs to 5 lbs.	30 lbs. at 50 M P.H.
S—1930	3 lbs. to 5 lbs.	30 lbs. at 30 M P.H.
C—1930	3 lbs to 5 lbs.	30 lbs. at 50 M.P.H.
H and U—1930	3 lbs. to 5 lbs.	30 lbs. at 50 M.P.H.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing data for all models of Hupmobile from 1925 to 1930 inclusive These cars have been equipped with three makes of ignition, namely, Atwater Kent, Delco Remy and Auto Lite

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
HUPMOBILE						
1925	R	014"-016"	†T D C	⅓ adv	022"-025"	1-2-4-3
1925	E-1	009"-012"	†T D C	Ret	* 028"-030"	1-5-2-3-8-4-7-6
1926	A-5	015"-018"	†T D C	Ret	* 022"-025"	1-5-3-6-2-4
1926	E-2	022"-027"	†T D C	Ret	* 028"-030"	1-5-2-3-8-4-7-6
1927	A-5	015"-018"	†T D C	Ret	* 022"-025"	1-5-3-6-2-4
1927	E-3	022"-027"	†T D C	Ret	* 028"-030"	1-4-7-3-8-5-2-6
1928	A-6	015"-018"	†T D C	Ret	* 022"-025"	1-5-3-6-2-4
1928	M	018"-022"	†T D C	Ret	* 028"-030"	1-4-7-3-8-5-2-6
1929	A-7	015"-018"	†T D C	Ret	* 022"-025"	1-5-3-6-2-4
1929	M	018"-022"	†T D C	Ret	* 028"-030"	1-4-7-3-8-5-2-6
1930	S	015"-018"	†T D C	Ret	* 025"-028"	1-5-3-6-2-4
1930	C	020"-022"	†T D C	Ret	* 028"-030"	1-4-7-3-8-5-2-6
1930	H	020"-022"	†T D C	Ret	* 028"-030"	1-4-7-3-8-5-2-6
1930	U	020"-022"	†T D C	Ret	* 028"-030"	1-4-7-3-8-5-2-6

Adv —Spark lever advanced Ret —Spark lever retarded T D C — Top dead center

*When adjusting spark plug and contact point clearance it is important that all gaps be exactly the same within the specified limits

†It is important when locating D C positions to always turn motor clockwise, and never back up in order that there will be no slack in the timing chain

Hupmobile Model R 1925.—To time the spark to the motor, locate the distributor so that the contact points just start to separate when piston No 1 is at top dead center of the compression stroke with the spark control lever in one third advance position. (See Ignition Timing Table for contact point clearance.)

Hupmobile Model E 1925.—To time the spark to the motor, locate the distributor so that the contact points just start to separate when piston No. 1 is at top dead center of the compression stroke with the spark lever in the fully retarded position. (See Ignition Timing Table for contact point clearance.)

Hupmobile All Six Cylinder Models 1926-30.—To time the spark to the motor, the contact points should just start to separate when piston No 1 is at top dead center of the compression stroke with the spark lever in fully retarded position. The flywheels on these models are marked with top dead center marks for pistons Nos. 1 and 6. (See Ignition Timing Table for contact point clearance.)

After the ignition timing operation has been completed, the car should be road tested and if necessary the timing advanced to a point where a slight ping is heard upon sudden acceleration or on a hard pull.

Hupmobile Eight Cylinder Models 1926-30.—Delco Remy and Auto-Lite distributors having double breaker arms and four lobe cams have been used as equipment on Hupmobile eight cylinder models from 1926 to 1930 inclusive. The distributor points on these models must be properly and correctly synchronized in order to obtain maximum efficiency in motor performance. If it should become necessary to synchronize the distributor points, complete information for both types will be found below.

When timing the distributor to the motor always time the stationary set of points to cylinder No. 1. To time the spark to the motor, locate the distributor so that the stationary contact points just start to open when piston No. 1 is at top dead center of the compression stroke with the spark lever in the fully retarded position. Piston No. 1 will be in the top dead center position when the flywheel mark indicating top dead center for piston Nos. 1 and 8 is directly under the pointer in the peephole in the flywheel housing. (See Ignition Timing Table for contact point gap clearance.)

After the timing operation has been completed, the car should be road tested and for best performance the timing should be advanced to the point where a slight ping is heard on sudden acceleration or on a pull.

To Synchronize Eight Cylinder Delco Remy Distributors With Four Lobe Cams.—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate. The points are arranged to break 45 degrees of distributor shaft rotation apart which is equal to 90 degrees of flywheel travel. The mark on the synchronizing tool No. 822572, Fig 1, which should be used for synchronizing these distributors is marked in flywheel degrees and can be obtained at any United Motors Service branch or authorized Delco Remy service station. One ignition coil is used with these distributors.

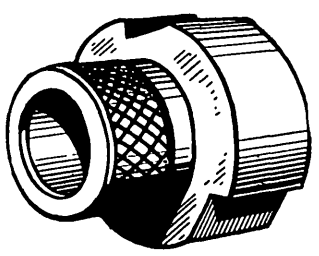


Fig. 1

Delco-Remy synchronizing tool No. 822572. The contact points should be synchronized to open 45 degrees apart of distributor shaft rotation which is equal to 90 degrees of flywheel travel.

The correct contact point setting will be found in the Ignition Timing Table. The breaker cam must be removed in order to use the synchronizing tool and much time can be saved in retiming the distributor to the motor if the position of the rotor is marked before removing the cam. In order to mark the position of the rotor, hold the rotor against rotation with the fingers to take up backlash in the gears and mark the position of the rotor with a corresponding mark on the side of the distributor housing. Next loosen the lock screws in the center of the cam and remove. Place the synchronizing tool Fig. 1 on the distributor shaft in place of the cam and rotate the tool with the fingers or pliers until the contact rubbing blocks drop into the notches in the side of the synchronizing tool.

Loosen lock screws which hold the movable plate and adjust by turning the eccentric screw with a screwdriver until both sets of contact rubbing blocks rest evenly against the flat side of the notches in the synchronizing tool. On earlier production distributors which do not have a movable plate and eccentric screw, the entire contact point plate which holds both sets of points must be moved until both rubbing blocks hit evenly against the side of the notches in the synchronizing tool.

Tighten the lock screws and check contact points for correct opening. Repeat the entire operation for accuracy.

Replace cam and rotor exercising care to see that the rotor registers with the locating mark previously placed on the distributor housing. Remove the rotor and tighten cam lock screws in center of cam and check rotor scratch marks again making sure that rotor is held against rotation when checking.

To Synchronize Eight Cylinder Auto-Lite Distributors With Double Breaker Arms and Four Lobe Cams.—On Auto-Lite IGH distributors one set of points is carried on the main breaker plate assembly and the other set is carried on a sub plate mounted on the main plate. To synchronize, first adjust both sets of points to the proper clearance (see Ignition Timing Table). The fixed breaker points are adjustable for gap openings by loosening the lock screw (A) Fig. 2 and the pivot screw (B) and adjusting with eccentric screw (C). After obtaining the correct gap, be sure both screws (A) and (B) are tight. Adjustment of the gap for the sub plate breaker points is made by the conventional screw point and lock nut.

To synchronize the two sets of points, first insulate the sub plate points from each other by placing a thin piece of fiber between them. Then crank the engine until the breaker points just open. This can be indicated by a timing light connected across the breaker arm and to ground. The points should be adjusted so that the timing light will light when the breaker cam backlash is turned in the direction of drive and go out when the backlash is turned against rotation.

On the top of the fan tail of the rotor will be found two timing marks 45 degrees apart (left view Fig. 3). With the rotor backlash taken up in the direction of drive place the synchronizing

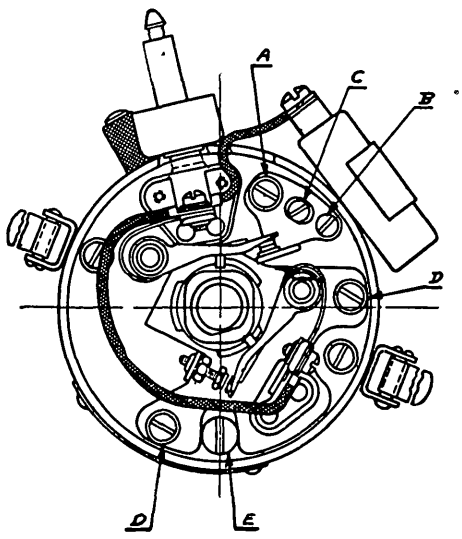


Fig. 2

Top view of Auto-Lite IGH distributor showing the position of the contact arms. One set of points is mounted on a stationary base and the other set is mounted on a movable base. The contact arms should be synchronized to separate 45 degrees apart, distributor shaft rotation, which is equal to 90 degrees of flywheel travel.

gauge (right view Fig. 3) on the edge of the distributor base so that the point is exactly in alignment with the clockwise line on right hand rotation distributors, or with the counter-clockwise line for left hand distributors. Next crank the engine until the other timing line on the distributor rotor is exactly in alignment with the point of the synchronizing gauge. Make sure that any backlash in the rotor is taken up in the direction of drive.

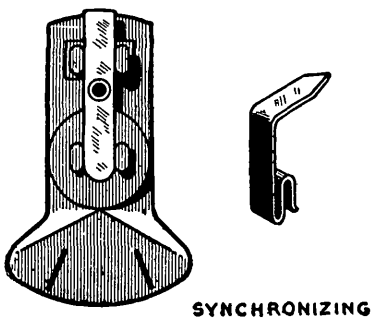
With the distributor rotor in this position, the sub plate point should be adjusted so that the timing light will light when the breaker arm backlash is turned in the direction of drive and go out when the backlash is turned against rotation. Before this test can be made the fiber between the sub plate points should be removed and inserted between the other set of points.

The sub plate points can be adjusted by loosening the two lock screws (D) Fig. 2 and rotating the sub plate with the eccentric screw (E) until the proper setting is obtained.

After synchronizing the two sets of points, turn the engine over a few times and recheck to make sure the exact setting has been obtained.

Fig. 3

Rotor and synchronizing tool used on Auto-Lite distributor Model IGH. Note that the fan tail of the rotor has two synchronizing marks, for synchronizing the contact arms.



VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for Hupmobile from 1925 to 1930 inclusive. All tappet clearances are given for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.				
HUP	MOBILE								
1925	R	* 005″		005″	006″	6° A		Opens	
1925	E-1	* 010″	010″	007″	007″	T D C		Opens	Closes
1926	A-5	* 010″	010″	008″	008″	T D C		Opens	Closes
1926	E-2	* 010″	010″	007″	007″	T D C		Opens	Closes
1927	A-5	* 010″	010″	007″	008″	T D C		Opens	Closes
1927	E-3	* 010″	010″	007″	007″	T D C		Opens	Closes
1928	A-6	* 010″	010″	008″	008″	T D C		Opens	Closes
1928	M	* 010″	010″	008″	008″	T D C		Opens	Closes
1929	A-7	* 010″	010″	008″	008″	T D C		Opens	Closes
1929	M	* 010″	010″	008″	008″	T D C		Opens	Closes
1930	S	* 010″	010″	008″	008″	T D C		Opens	Closes
1930	C	* 010″	010″	007″	015″	T D C		Opens	Closes
1930	H	* 010″	010″	008″	014″	T D C		Opens	Closes
1930	U	* 010″	010″	008″	014″	T D C		Opens	Closes

A —After top dead center T D C —Top dead center.

*When checking the valve timing it is very important that the tappet adjustment be accurately set according to tappet adjustment for valve timing owing to the overlap in valve action After valve timing operations are complete reset tappets to correct running clearance.

Hupmobile R 1925.—To check the valve timing, adjust the valve tappet clearance of No. 1 intake valve to .005″. The intake valve should just start to open when the flywheel mark I-0 1-4 registers with the center line of the engine. This center line will be found to be at a point measured 2 15/32″ from the side of the long stud at the rear of the engine base just above the flywheel. (See Valve Timing Table for valve tappet clearances.)

Hupmobile All Six and Eight Cylinder Models 1926-30.—To check the valve timing, set the tappet clearance of No. 1 intake and exhaust valves at exactly .010″. Crank the motor until No. 1 intake valve tappet has just taken up the .010″ clearance and No. 1 exhaust valve has just closed. At this point the flywheel mark indicating top dead center of No. 1 piston should register with the indicator of the peephole in the flywheel housing. Reset the valve tappet clearance after the timing operation is complete. (See Valve Timing Table for valve tappet clearances.)

TIMING CHAIN ADJUSTMENT

Hupmobile Model S 1930.—This model of Hupmobile is not provided with a manual timing chain adjustment.

Hupmobile All Models 1925-30 Except Model S 1930.—To adjust the timing chain, loosen the three generator flange nuts and the adjusting screw lock nut. With the motor running, turn the adjusting screw to the right clockwise moving the generator out from the crankcase until the chain develops a slight hum, then back off on the screw until the hum disappears. Tighten the lock nut and anchor the bolt nut securely.

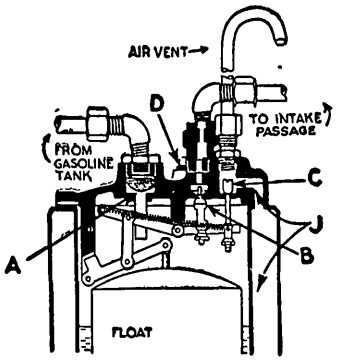


Fig. 4

Upper half of vacuum tank showing position of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

GAS LINE SCREENS

All models of Hupmobile from 1925 to 1929, also Series S 1930 came equipped with vacuum tank fuel feed and have two strainer screens in the gas line. One is located in the head of the vacuum tank Fig. 4 and the other is located at the carburetor. To clean the screen in the vacuum tank head, disconnect the gas line, remove the elbow and bushing together with the screen. Clean thoroughly with gasoline and blow clear with air.

To clean the strainer at the carburetor, disconnect the gas line and remove the plug and screen from the strainer body. Clean the strainer and strainer body thoroughly in gasoline and blow dry with air.

On models equipped with a sediment bowl located under the vacuum tank, there is a strainer in the glass bowl which should be removed for cleaning at intervals. This can be accomplished by closing the shut off valve directly above the bowl and then turning the lever that supports the bowl down. After cleaning and when reassembling, be sure that the lever is all the way up and that the bowl seats firmly.

Hupmobile Series C, H and U 1930 are equipped with fuel pump feed.—There are two strainer screens in the gas line. One is located in the fuel pump Fig. 5 and the other in the carburetor at the point where gasoline enters. To clean the fuel pump screen, remove the glass bowl and screen assemblies, wash in gasoline and dry with air. Be sure that the bowl gasket is in good condition and properly seated when assembling the bowl into position.

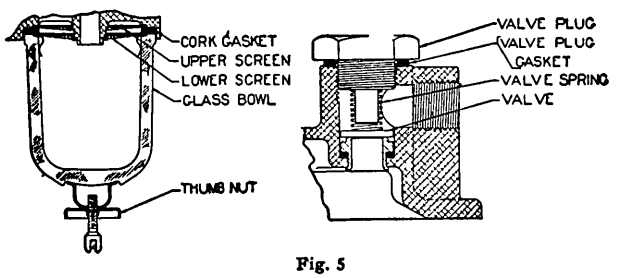


Fig. 5

Cross sectional view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

To clean the strainer in the carburetor, remove the plug and strainer from the strainer body, clean thoroughly with gasoline and blow clear with compressed air.

Carburetor Specifications

FLOAT LEVEL

Stromberg Carburetors

When Stromberg carburetors are shipped from the Chicago factory, the float levels are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When high test (lower specific gravity) 68° to 70° Baumé fuel is used, the float level rises making it necessary to readjust the level by bending the float arm.

A table of fuel levels for both high and low test gasoline will be found on page 70 under the heading Affect of Fuel on Float Levels.

Stromberg Model M-1.—The fuel level will be correct when there is 5/32″ vertical movement of the needle valve. To correctly adjust the float level, remove the valve cap that covers the upper end of the needle stem, loosen the lock nut, hold the needle sleeve from turning and turn the needle in until it seats; then turn it out away from its seat just two turns.

Stromberg Model OX-2.—The correct float level with the motor not running is 1″ from top of float to the machined top surface of the float chamber. To adjust the float level, remove the float needle valve cap and the upper end of the float needle stem will be seen. Loosen the lock nut and turn the needle down (clockwise) if the level is too high, or up (counter-clockwise) if the level is too low.

Stromberg Model OO-2.—When the motor is not running, the gasoline in the float bowl should stand at a level even with the bottom of the level sight hole in the side of the bowl when the plug is removed.

To adjust the float level, remove the float chamber cover and bend the float lever arm up to raise the level and down to lower the level.

Stromberg Model OE-1.—The gasoline in the float bowl should stand at a level 1″ below the machined top surface of the float chamber or even with the bottom of the sight level hole in the side of the bowl with the plug removed. To adjust the float level, remove the float valve cap and the upper end of the float needle stem will be seen. Loosen the float needle sleeve lock nut and turn down (clockwise) if the fuel level is too high or up (counter-clockwise) if fuel level is too low.

Stromberg Model T-1 and T-2.—The gasoline level in the float bowl with the motor not running should stand even with the bottom of the sight level hole in the side of the bowl with the plug removed. This distance is 7/32″ below the machined top surface of the float chamber casting. To adjust the float level bend the float lever up or down the desired distance.

Stromberg Model U-2.—The fuel level will stand at the correct height in the float bowl when the distance from the top of the float to the lower gasket surface of the float chamber cover is 3/64". To adjust the float level, bend the float lever arm down to lower the level and up to raise the level.

Stromberg Model UU-2.—The gasoline in the float chamber bowl should stand at a level just even with the bottom of the sight level hole in the side of the float bowl with the plug removed and the engine not running. To adjust the float level, bend the float lever arm down to lower the level and up to raise the level.

Stromberg Model DD-3.—The fuel in the float bowl will stand at the correct level when the distance, with the motor not running, from the lower surface or gasket face of the float chamber cover to the top of the float at the center is 23/64". To adjust the float level, bend the float lever arm down to lower the level and up to raise it.

CARBURETOR SPECIFICATION DIAGNOSIS

Several models of Stromberg carburetors have been used on Hupmobile automobiles from 1925 to 1930 inclusive. The jet specification information for each model of carburetor is given in the following paragraphs under the heading of the carburetor. In the tables following the jet specification information will be found the jet calibration sizes arranged by car model.

STROMBERG CARBURETORS

Jet Measurements.—All jet and nozzle measurements for all models of Stromberg carburetors used on Hupmobiles are given either in wire drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch is given below.

How to Read Stromberg Model Numbers.—The first letter of a Stromberg model designation indicates the type; the following letter indicates some form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor. The size starting from 1" which is No. 1 and increasing in ¼" steps. For example, take a U type carburetor. A U-1 has a 1" throat while a U-2 has a 1¼" throat. The actual diameter of the carburetor opening is 3/16" greater than the nominal rated size in accordance with the standard of The Society of Automotive Engineers.

An "X" in the model symbol indicates that the flange bolt holes are at right angles to the line of air entrance to the float chamber, the carburetor being usually installed so that the throttle shaft is parallel to the engine and crankshaft and the line of the intake manifold. The letter "V" in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as "TV" or "TXV."

Drill Sizes

The following table contains twist drill and steel wire gauge sizes and areas together with nearest equivalent metric sizes.

Drill No	Dia. In	Area, Sq In	Nearest Metric Size, MM	Dia In	Area, Sq In	Drill No	Dia In	Area Sq. In.	Nearest Metric Size, MM	Dia In	Area Sq In
1	2280	04082	5 8	2298	04093	41	0960	00723	2 45	0965	00731
2	2210	03835	5 6	2205	03819	42	0935	00686	2 35	0925	00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	0866	00589
5	2055	03316	5 2	2047	03291	45	0820	00528	2 10	0827	00537
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	0807	00512
7	2010	03173	5 1	2008	03167	47	0785	00483	2 00	0787	00486
8	1990	03110	5 1	2008	03167	48	0760	00453	1 95	0768	00463
9	1940	03017	5 0	1967	03039	49	0730	00418	1 85	0728	00416
10	1935	02942	4 9	1929	02918	50	0700	00384	1 80	0709	00395
11	1910	02865	4 9	1929	02918	51	0670	00352	1 70	0669	00352
12	1890	02805	4 8	1890	02903	52	0635	00316	1 60	0630	00312
13	1850	02688	4 7	1850	02688	53	0595	00278	1 50	0691	00274
14	1820	02601	4 6	1811	02576	54	0550	00237	1 40	0551	00238
15	1800	02544	4 6	1811	02576	55	0520	00212	1 30	0512	00206
16	1770	02460	4 5	1772	02456	56	0465	00169	1 20	0472	00175
17	1730	02350	4 4	1732	02356	57	0430	00145	1 10	0433	00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	1660	02164	4 2	1654	02149	59	0410	00132	1 05	0413	00134
20	1610	02035	4 1	1614	02046	60	0400	00125	1 00	0394	00122
21	1590	01985	4 0	1575	01948	61	0390	00119	1 00	0394	00122
22	1570	01936	4-0	1575	01948	62	0380	00113	95	0374	00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	00110
24	1520	01814	3 9	1535	01851	64	0360	00101	90	0354	00098
25	1495	01755	3 8	1496	01758	65	0350	00096	90	0354	00098
26	1470	01697	3 7	1457	01667	66	0330	00085	85	0335	00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01452	3 5	1378	01491	69	0292	00067	75	0295	00068
30	1285	01296	3 3	1299	01325	70	0280	00061	70	0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0256	00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	0256	00051
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00034	55	0217	00037
36	1065	00890	2 7	1063	00887	76	0200	00031	50	0197	00030
37	1040	00849	2 6	1024	00824	77	0180	00025	45	0177	00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00015
40	0980	00754	2 5	0984	00760	80	0135	00014	35	0138	00015

Specification Diagnosis

(Stromberg Model DD-3)

Stromberg DD carburetors are of the two barrel down draft type used on 1930 Hupmobile cars. There are seven points at which the internal adjustment of this carburetor may be changed to affect its operation. These points will be considered in their proper order in the following paragraphs.

Idling Discharge Jet (Stromberg Model DD-3).—In each barrel of this carburetor will be found two idling openings. One is located below the throttle valve and the other is located above the throttle valve. The opening below the throttle valve is the small hole and is the slow idling jet while the opening above the throttle valve is the large hole and is the fast idling jet. Both discharge jets above and below the throttle are fixed openings. The idling mixture is controlled by means of an idling adjusting screw which is an air bleed and actually controls the amount of air that passes into the idling tube.

Jobs may be encountered where someone unfamiliar with correct carburetor calibration procedure has drilled out the idle openings. For complete diagnosis on how to determine when the

idling jets have been tampered with or changed will be found under Carburetor Specification Diagnosis in the Stromberg Section in the back of the book under the heading Stromberg Model DD.

Main Metering Jet Stromberg Model DD-3.—On the Stromberg Model DD-3 carburetor used on Hupmobile there are two metering jets for the purpose of metering fuels to the main discharge jet. These metering jets control the flow of gasoline for speeds above 25 miles per hour, and may be either of the fixed size or adjustable type. Complete specification diagnosis information for main metering jets will be found in the Stromberg Section in the back of the book under Carburetor Specification Diagnosis for Stromberg Model DD.

By-Pass Jet (Stromberg Model DD-3).—The purpose of the by-pass jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet; namely, the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small. For complete diagnosis information covering these troubles see Carburetor Specification Diagnosis for Model DD in the Stromberg Section in the back of the book.

Main Discharge Jet. (Stromberg Model DD-3).—The main discharge jets on all Stromberg Model DD-3 carburetors used on Hupmobile are not changeable. That is, the main discharge nozzles insofar as specifications are concerned are the same for any particular model of car and under no consideration should these jets be drilled out or changed.

High Speed Air Bleed (Stromberg Model DD-3).—The high speed air bleeder on the Stromberg Model DD-3 carburetors are mounted on the end of the main discharge jet. These air bleeders and the main discharge jets have been calibrated to work in perfect balance at the factory. Therefore, any changes of the air bleeders should be avoided. Cases may be encountered, however, where someone unfamiliar with the correct carburetor procedure has tampered with these bleeders. For complete diagnosis information covering these troubles see Carburetor Specification Diagnosis for Model DD in the Stromberg Section in the back of the book.

Accelerating Pump (Stromberg Model DD-3).—The pump discharge jet regulates the flow of gasoline from the accelerating pump and affects the operation of the carburetor during quick acceleration only. The accelerating pump on all models of DD-3 carburetors used on Hupmobile are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of an adjusting screw. Complete information on adjustment of the pump stroke for these carburetors will be found in the Carburetor Adjustment Section under Accelerating Pump Adjustment.

Venturi Tubes (Stromberg Model DD-3).—All venturi tubes on Stromberg Model DD-3 carburetors used on Hupmobile are removable and are held in by a set screw and lock nut. In practice it is seldom that trouble from a venturi tube of wrong size is experienced. However, complete specification diagnosis information for this trouble will be found under Carburetor Specification Diagnosis for Model DD in the Stromberg Section in the back of the book.

Specification Diagnosis
(Stromberg Model OE-1)

Stromberg Model OE-1.—There are six points at which the internal adjustment of a Stromberg Model OE-1 carburetor used on a Hupmobile may be changed to affect its operation. These points will be considered in their proper order in the following paragraphs.

Idle Discharge Jet (Stromberg OE-1).—There are two idling discharge jets found in the barrel of a Stromberg Model OE-1 carburetor. One, the small jet is located above the throttle valve and the other, a larger jet is found below the throttle valve. These openings are made in the carburetor body and under no consideration should they be drilled out or tampered with in any way. Complete specification diagnosis information for cases of trouble where the jets have been tampered with will be found under Carburetor Specification Diagnosis for Model O in the Stromberg Section in the back of the book.

High Speed Adjustment (Stromberg Model OE-1).—The high speed adjustment will take care of all ranges within the limit of performance of the carburetor. Very little trouble will be experienced with high speed adjustment from any cause other than wear. See High Speed Adjustment in the Carburetor Adjustment Section.

Accelerating Well Bleeder and Discharge Jet (Stromberg OE-1).—Trouble with the accelerating well bleeder and discharge jet may be indicated by a noticeable flat spot on acceleration. Complete diagnosis information covering accelerating well bleeder and discharge jet will be found under Carburetor Specification Diagnosis for Model O in Stromberg Section in the back of the book.

Economizer Needle (Stromberg Model OE-1).—The economizer needle very seldom gives trouble other than improper adjustment. See Economizer Needle under Carburetor Adjustment for Model O in the Stromberg Section in the back of the book.

Main Discharge Jet (Stromberg Model OE-1).—It will generally be found in practice if trouble is experienced that someone has tampered with the main discharge jet either by drilling it out or installing a larger size. If the jet is too large the gasoline mileage will be low. For more complete information see Carburetor Specification Diagnosis for Model O in Stromberg Section in the back of this book.

Economizer Needle Air Bleed (Stromberg Model OE-1).—On the Model OE-1 carburetor used on Hupmobile the economizer needle is drilled and should never be changed under any consideration since the main discharge jet and economizer needle air bleed have been calibrated to work in perfect balance at the Stromberg factory. If the economizer needle sticks in the open position, the motor will have a tendency to run rough and may sputter in the carburetor at speeds above 40 M.P.H.. More complete information for jobs that have been tampered with will be found under Carburetor Specification Diagnosis for Model O in the Stromberg Section in the back of the book.

Venturi Tubes (Stromberg Model OE-1).—The venturi tubes on Stromberg OE-1 carburetors are removable units and are held into place by a set screw and lock nut. In practice, it is seldom that trouble from a venturi of the wrong size is experienced. However, if someone has tampered with the venturi tube more complete information can be found under Carburetor Specification Diagnosis for Model O in the Stromberg Section in the back of the book.

Specification Tables.—The following tables contain calibration specification data for all models of Stromberg O carburetors used on Hupmobile automobiles from 1925 to 1930 inclusive. The specification tables are arranged by car model.

Hupmobile A-5 1926

(Stromberg OE-1 Engine 3⅛"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55-#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 11/32")	.....	#56
Main Discharge Jet	.....	‡A-34, B-20
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#32
Accelerating Well Discharge Jet	.....	#58
Venturi	15/16"	.....

*The idle jet above the throttle is a #70 wire drill size; the jet below the throttle is a #55 wire drill size.
†This is a single end bleeder #32 wire drill size.
‡First bore of main discharge jet is #34 wire drill; second bore #20 wire drill.

Hupmobile E-1 1925

(Stromberg OX-2 Engine 2⅞"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#60
Main Discharge Jet	.....	‡A–38, B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#34–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	1 1/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #54 wire drill size.
†This is a double end bleeder having one end #34 wire drill size and other end #30 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill.

Hupmobile E-2 1926

(Stromberg OX-2 Engine 2⅞"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#60
Main Discharge Jet	.....	‡A–38, B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	1 3/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #54 wire drill size.
†This is a double end bleeder having one end #26 wire drill size and the other end #30 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill.

Hupmobile E-3 1927

(Stromberg OX-2 Engine 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve	.....	#60
Main Discharge Jet	.....	‡A–38, B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	1 3/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #54 wire drill size.
†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill.

Hupmobile E-4, M 1928

(Stromberg OO-2 Engine 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets (Dual body)	.....	1–#56 top 2–#56 lower
Main Metering Jet		Adjustable
Idle Air Reducer	.....	2–#55
Main Discharge Jet	.....	‡#A–28, #B–20
High Speed Air Bleeder	.....	#65
Accelerating Well Bleeder (Fixed bleeder)	.....	#43
Accelerating Well Discharge Jet	.....	#53
Venturi	15/16"	.....

*The idle jet above the throttle is a #56 wire drill size; the two jets below the throttle are #56 wire drill size.
‡First bore of main discharge jets is #28 wire drill; second bore #20 wire drill.

Specification Diagnosis

(Stromberg Model T)

Stromberg Model T-1 and T-2.—All Model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and the high speed air bleed but all other specifications as to principle of operation and jet diagnosis are the same.

High Speed Air Bleed (Stromberg T-1 and T-2).—The difference between the air bleed arrangement on Stromberg Model T and O is that the O type has the air bleed needle drilled. The T type has a separate air bleed and the economizer needle is blank. (See Specification Diagnosis for Stromberg Model OE-1).

Specification Tables.—The following specification tables contain the carburetor calibration specifications for Stromberg Model T-1 and T-2 used on Hupmobile automobiles. The tables are arranged by car model.

Hupmobile A-5 1927

(Stromberg T-1 Engine 3⅛"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ⅜")	.....	Blank
Main Discharge Jet	.....	‡#A–34, B–28
High Speed Air Bleeder	.....	#56
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	15/16"	.....

*The idle jet above the throttle is a #70 wire drill size; the jet below the throttle is a #56 wire drill size.
†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.
‡First bore of main discharge jet is #34 wire drill; second bore #28 wire drill.

Hupmobile A-6 1927 and 1928

(Stromberg T-2 Engine 3¼"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ¼")	.....	Blank
Main Discharge Jet	.....	‡#A–32, #B-18
High Speed Air Bleeder	.....	#70
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#58
Venturi	1 ⅛"	.....

*The idle jet above the throttle is a #70 wire drill size; the jet below the throttle is a #55 wire drill size.
†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.
‡First bore of main discharge jet is #32 wire drill; second bore #18 wire drill.

Specification Diagnosis

(Stromberg Model U)

Stromberg Model U-2.—Stromberg U-2 carburetors were used on Hupmobiles in 1929 and 1930. There are seven places at which the internal adjustment of a Model U carburetor may be changed to affect its operation. The following diagnosis information is for the purpose of enabling the mechanic to determine whether or not someone unfamiliar with the correct carburetor calibration procedure has tampered with the jets by drilling up or soldering up openings.

Idle Discharge Jet (Stromberg Model U-2).—Two idling discharge openings are provided in the throat of the carburetor. One, the small opening is located above the throttle and the other, the large opening is located below the throttle. Under no consideration should these idling jets be drilled out or plugged up; however, jobs may be encountered where someone unfamiliar with the correct carburetor calibration procedure may have tampered with these openings. For more complete information see Carburetor Specification Diagnosis for Stromberg Model U in Stromberg Section in the back of the book.

Main Metering Jet (Stromberg Model U-2).—The main metering orifice controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type. If the carburetor is equipped with a fixed type jet, more complete diagnosis information which will enable a mechanic to determine whether or not the main metering jet is of the wrong size will be found under Carburetor Specification Diagnosis for Model U in the Stromberg Section in the back of the book.

By-Pass Jet (Stromberg Model U-2).—The purpose of the by-pass jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. The by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small. Complete diagnosis information which should enable the mechanic to determine whether or not the by-pass jet is correctly adjusted will be found under Carburetor Specification Diagnosis for Model U in the Stromberg Section in the back of the book.

Main Discharge Jet (Stromberg Model U-2).—It is seldom in actual practice that a large main discharge jet on a Model U carburetor will have any affect on carburetor performance other than to lower the gasoline mileage. This condition holds true, however, within certain limits. By that we mean that a main discharge jet may be so large that it will throw the carburetor completely out of balance. Care should be exercised not to confuse the symptoms caused by a large discharge jet with those produced by a large by-pass jet. More complete information will be found under Carburetor Specification Diagnosis for Model U in the Stromberg Section in the back of the book.

High Speed Air Bleeder (Stromberg Model U-2).—The high speed air bleeder and main discharge jet have been calibrated at the factory to work in perfect balance; therefore, any changes of the air bleed should be avoided. However, jobs will be encountered where someone unfamiliar with the correct carburetor calibration procedure may have tampered with the high speed air bleeder. More complete information will be found under Carburetor Specification Diagnosis for Model U in the Stromberg Section in the back of the book.

Accelerating Pump (Stromberg Model U-2).—The accelerating pump affects the operation of the carburetor on quick acceleration only. The pump discharge is controlled by the pump discharge jet, so that failure of the motor to accelerate properly may be caused by a pump discharge jet of the wrong specifications. For more information see Carburetor Specification Diagnosis for Model U in Stromberg Section in the back of the book.

Venturi Tubes (Stromberg Model U-2).—Two types of venturi tube design are used in Stromberg Model U carburetors. In one type the venturi is cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed. In practice, it is seldom that trouble from a venturi tube of wrong size is experienced. However, if a job is encountered where someone has tampered with the venturi tube, more information will be found under Carburetor Specification Diagnosis for Model U in the Stromberg Section in the back of the book.

Specification Tables.—The following carburetor calibration specification tables are arranged by car model and include the correct calibration data for Stromberg U-2 carburetors.

Hupmobile A-7 1929

(Stromberg U-2 Engine 3¼"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#52–#65
Main Metering Jet	.060"	.....
High Speed Needle Valve (open No. notches)	.....	Blank
By-Pass Jet	.042"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#58
Pump Reducer	.....	#70
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/32"	.....

*The idle jet below the throttle is #52 wire drill size; the jet above the throttle is #65 wire drill size.

Hupmobile S 1930

(Stromberg U-2 Engine 3¼"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#65
Main Metering Jet	.....	.....
High Speed Needle Valve (open No. notches)		Adjustable
By-Pass Jet	.025"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#65
Pump Reducer	.....	#71
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 3/32"	.....

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #65 wire drill size.

Specification Diagnosis

(Stromberg Model UU-2)

Stromberg Model UU-2.—The Model UU series of Stromberg carburetors have the same float mechanism, venturis, main discharge jets and idle systems as the Model OO but carries the accelerating pump and economizer of the U series. A needle adjustment is supplied to control the pump action, its setting ranging from one-half turn open in the summer to three turns open in the winter. Plug type metering jets of the Model U series are employed.

In each barrel of the carburetor will be found two idling openings; one is located below the throttle valve and the other is located above the throttle valve. The opening below the throttle valve is a set opening and the gasoline and air mixture that passes through this opening is regulated by an air bleed hole which is located just below the idling adjustment knurled nut.

Complete carburetor specification diagnosis information for wrong size idle air bleed hole, main metering jet, main discharge jet, high speed air bleeders and venturi tubes will be found in the Stromberg Section in the back of this book under the heading Model UU.

The pump discharge of the UU Stromberg carburetors is adjusted by means of an adjusting screw or needle valve. Complete adjustment information for the accelerating pump will also be found in the Stromberg Section.

Hupmobile M 1928-29

(Stromberg UU-2 Engine 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#56
Main Metering Jet	.043"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-Pass Jet	.....	#72
Main Discharge Jet	.....	†#A–28, #B–20
High Speed Air Bleeder	.....	#70
Pump Reducer	.....	.....
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 3/32"	.....

*The two idle jets below the throttle are #56 wire drill size; the jet above the throttle is #56 wire drill size.
†First bore of main jet is a #28 wire drill; second bore is a #20 wire drill.

Hupmobile C 1930

(Stromberg UU-2 Engine 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#56
Main Metering Jet	.042"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-Pass Jet	.....	#72
Main Discharge Jet	.....	†#A–28, #B–20
High Speed Air Bleeder	.....	#70
Pump Reducer	.....	.....
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/32"	.....

*The two idle jets below the throttle are #56 wire drill size; the jet above the throttle is #56 wire drill size.
†First bore of main jet is #28 wire drill; second bore is a #20 wire drill.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
HUPMOBILE					STEWART
1926	A-5	Own	6	3⅛"x4¼"	CR25—1"
					STROMBERG
1925	R-12 to R-15	Own	4	3¼"x5½"	M-1
1925	E-1	Own	8	2⅞"x4¾"	OX-2
1926	A-5	Own	6	3⅛"x4¼"	OE-1
1926	E-2	Own	8	2⅞"x4¾"	OX-2
1927	A-5	Own	6	3⅛"x4¼"	T-1
1927	E-3	Own	8	3 "x4¾"	OX-2
1928	A-6	Own	6	3¼"x4¼"	T-2
1928	E-4, M	Own	8	3 "x4¾"	OO-2
1929	A-7	Own	6	3¼"x4¾"	T-2 and U-2
1929	M	Own	8	3 "x4¾"	UU-2
1930	S	Own	6	3¼"x4¼"	U-2
1930	C	Own	8	3 "x4¾"	UU-2
1930	H and U	Own	8	3½"x4¾"	DD-3

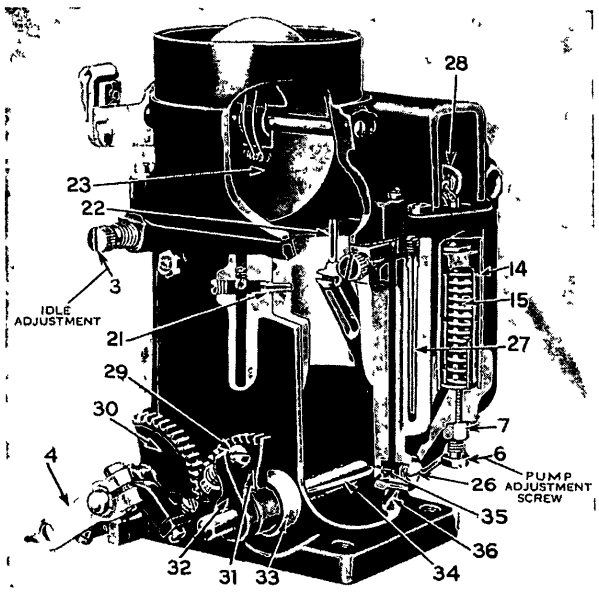


Fig. 6

Cutaway section of Stromberg DD carburetor showing (3) idling needle valve, (4) throttle lever, (6) pump adjusting screw, (7) pump adjusting screw lock nut, (14) vacuum piston, (15) vacuum piston spring, (21) pump discharge nozzle, (22) high speed air bleeder, (23) choke valve, (26) idle discharge plug, (27) idle tube, (28) pump lever, (29) throttle synchronizing screw, (30) throttle gear (right), (31) throttle gear (left), (32) throttle synchronizing lever, (33) throttle return spring, (34) throttle valve; (35) idling discharge holes, (36) economizer suction hole.

ADJUSTMENT PRECAUTIONS

Effect of Intake Manifold on Carburetor Adjustment.—Present day fuels contain heavy fractions which separate from the more volatile ends and deposit in liquid form on the walls inside the manifold and are held there by the rush of mixture toward the cylinders; therefore, it is important when making a carburetor adjustment that from 10 to 15 seconds time is allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making an adjustment from a rich to a lean mixture. Insufficient time between the movements of the adjusting screw are generally indicated by the motor performance gradually improving during the adjusting procedure and then suddenly dying.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. This is especially true of the idle and range adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment, there is a wide range between the point of where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Poor Idling (Stromberg Model U).—If trouble is experienced in obtaining a smooth idle on Hupmobiles equipped with Stromberg Model U carburetors the trouble may be caused by a high vacuum above the throttle valve. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to Roll and load will be noticed. In extreme cases, the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic

To correct the trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat on the same side of the throttle shaft and opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless the trouble cannot be corrected by reducing the size of the main metering jet or economizer bypass jet

As described in the tune-up precautions following the tune-up operations under Ragged Idle, difficulty experienced in obtaining a correct idling adjustment on cars equipped with Stromberg UU carburetors may be caused by the throttle valves not being properly synchronized. (See Throttle Valve Improperly Synchronized under Ragged Idle).

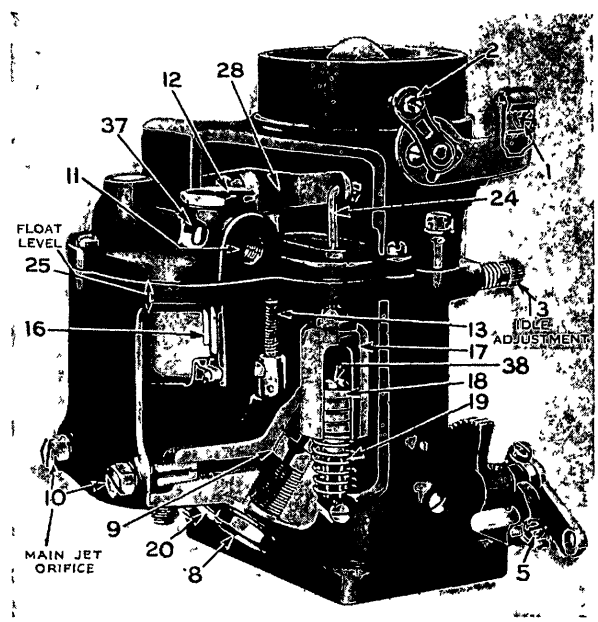


Fig 7

Cutaway section of Stromberg DD carburetor showing (3) idling needle valve (5) throttle stop set screw, (8) main discharge nut; (9) main discharge jet retainer plug, (10) main metering jet, (11) gasoline connection, (12) strainer plug, (13) economizer needle valve, (16) float needle valve and seat, (17) pump piston sleeve, (18) pump piston, (19) pump piston spring, (20) bypass metering jet (economizer), (24) pump piston link; (25) float setting (see instructions) (28) pump lever, (37) gasoline strainer, (38) pump stud.

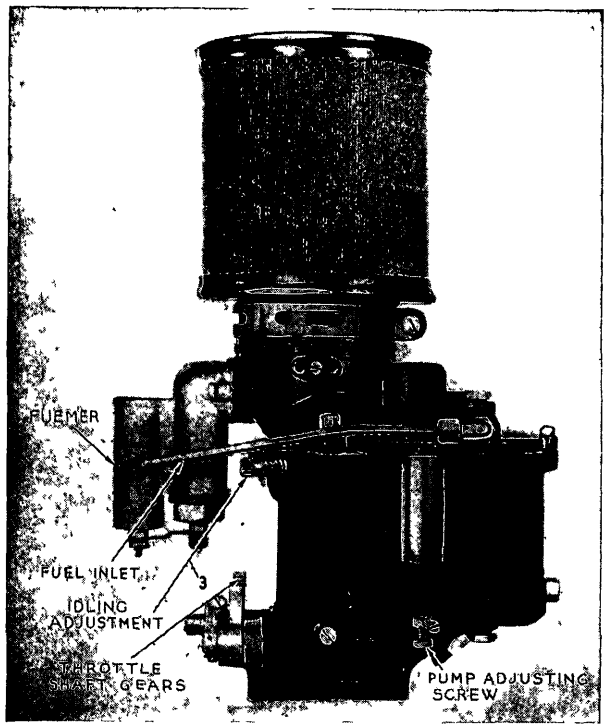


Fig. 8

View of Stromberg DD down draft carburetor used on Hupmobile showing location of Fuemer for starting. This Fuemer is electrically connected to the starting motor and gasoline is pumped into the Fuemer chamber by means of an electric valve, every time the starter switch is closed. The heating element in the Fuemer chamber vaporizes the gasoline which passes into the carburetor in the form of a heavy gasoline vapor.

General Information.—A correct carburetor adjustment cannot be obtained on any Model of Hupmobile unless the motor is thoroughly warmed up. Idle the motor for at least 10 minutes before attempting a carburetor adjustment. Before changing any of the carburetor adjustments, check for leaky carburetor flange and manifold gaskets and make sure that the choke valve opens and closes properly.

STROMBERG DD-3

The Stromberg Model DD-3 carburetor used on Hupmobile 1930 models is of the dual down draft type with one adjustment for idling speeds only. As shown at (3) Fig. 6, there is one idle adjusting screw for each barrel of the carburetor. The flow of gasoline to the main discharge jet is controlled by set orifices as shown at (10) Fig. 7.

Carburetor Adjustment.—The accelerating pump adjustment shown at (6) Fig. 6 must be properly made in order to obtain correct motor performance on acceleration. Complete adjustment information for Stromberg DD-3 carburetors will be found under Stromberg DD-3 in the Stromberg Section in the back of this book.

Carburetor Fuemer

The As-Ke Fuemer is a small electric heater attached to the air horn of the carburetor which vaporizes or fumes a small charge of gasoline to make easy starting of engines in cold weather. (See Fig. 8). The electric connection is made direct to the terminal of the starting motor so that the Fuemer operates to produce a heavy charge of vaporized gasoline upon every application of the starter.

The gasoline enters the Fuemer through a magnetic valve electrically connected to the Fuemer terminal. Upon every application of the starter the valve opens and gasoline is forced into the Fuemer chamber by a fuel pump connected to the valve chamber. A 3/8" hole is placed in the Fuemer chamber to permit air to flow in with the fumes to form a combustible mixture for starting the motor. The screen protection in this 3/8" hole should always be kept clean; otherwise, the Fuemer mixture may be too rich for firing. Beside facilitating starting in cold weather, the Fuemer as installed lessens the amount of raw fuel flooded into the manifold during cranking and warming up of the motor.

The heating elements are made of resistance wire partially embedded in pads of pure asbestos and hold firmly together by fixed mica sleeves Gasoline contacts with the hot filament through the two 3/16" holes located in the side of the Fuemer. The heavy vaporized charge escapes through the cap into the air inlet of the engine when the Fuemer operates.

STROMBERG MODEL M-1

This carburetor is of the plain tube type having no air valve or metering needle. Both the air passage and gasoline jet are of fixed size for all engine speeds.

Carburetor Adjustment.—Complete adjustment information for Stromberg Model M will be found under Stromberg Model M in the Stromberg Section in the back of the book. This section also contains cuts and illustrations which should enable the mechanic to thoroughly understand this model of carburetor.

STROMBERG 00-2

The Stromberg Model OO-2 carburetor used on Hupmobile is of the two barrel type having both an idle and high speed adjustment. The accelerating well is controlled by means of a thermostat.

Carburetor Adjustment.—Complete adjustment information for Stromberg Model OO-2 will be found in the Stromberg section in the back of this book. This section also contains cuts and illustrations which should enable the mechanic to thoroughly understand this model of carburetor.

STROMBERG OE-1

The adjustment information for all Stromberg Model O series of carburetor is practically the same. Before attempting a carburetor adjustment,

all other adjustments should be properly made such as ignition timing, spark plug and contact point setting and the motor should be thoroughly warmed up.

Carburetor Adjustment.—For complete information and cross sections of the Stromberg OE-1 carburetor see Stromberg Model O in the Stromberg Section in the back of the book.

STROMBERG OX-2

The adjustment information for Stromberg OX-2 carburetor is the same as that for Stromberg OE-1. (See Stromberg OE-1 above).

STROMBERG T-2

The Stromberg Model T series of carburetors is very similar to the Model O type with the exception of a slightly different float construction and economizer air bleed. On the T type carburetors, the air bleed is a separate opening and the economizer needle is blank while on the O type of carburetor the economizer needle is drilled.

Carburetor Adjustment.—Complete adjustment information, together with cross section views of the Stromberg Model T carburetor used on Hupmobile, will be found under Stromberg Model T in the Stromberg Section in the back of the book.

STROMBERG MODEL U-2

The Model U series carburetors are chiefly characterized by a special form of accelerating pump which gives a more powerful and positive accelerating discharge at low speeds than can be obtained with suction operated wells. The smaller sizes of this series have the single venturi tube and an inclined main discharge jet and are usually fitted with fixed size metering jets. However, adjustable metering jets can be obtained if desired. A gasoline economizer device is also used.

Carburetor Adjustment.—Complete adjustment information together with cross section views will be found under Stromberg Model U in the Stromberg section in the back of the book.

STROMBERG MODEL UU

The Model UU series of Stromberg carburetors used on Hupmobile automobiles have the same float mechanism, venturis, main discharge jets and idling systems as the Model OO but carry the accelerating pump and economizer of the U series. A needle adjustment is supplied to control the pump action its setting ranging from one half turn open in summer to three turns open in winter. Plug type metering jets of the Model U series are employed.

Carburetor Adjustment.—Complete adjustment information together with cross section views of the UU carburetor will be found under Stromberg Model UU in the Stromberg Section in the back of this book.

Jordan 1925-30

Motor Tune-Up

When timing a Jordan motor, particular care should be exercised to see that the contact points are free, properly spaced and correctly timed. The spark plug gaps should be correctly adjusted (see Ignition Timing Table) and the timing chain should be properly adjusted (see Timing Chain Adjustment).

Following the tune-up operations will be found special information pertaining to motor tune-up. This information should be closely observed for best results.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points; oil distributor governor.
   Note: The distributor governor is lubricated by a felt pad which is located in a recess at the top of the distributor shaft directly under the rotor. It is important that this pad be saturated with oil at regular intervals.
2. Check timing chain for slack; adjust if necessary.
   Note: This operation is not regularly included in a motor tune-up but is important when timing the motor. If the timing chains are found to be loose an extra charge should be made for tightening.
3. Synchronize distributor points.
   Note: The above operation is necessary only on those models having distributors with two sets of breaker contacts.
4. Check ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan belt; adjust if necessary.
   Note: If the fan belt is adjusted too tight, it will cause excessive wear to the water pump shaft and bushing. This condition will cause a water leak around the packing gland and can only be corrected by replacing the worn parts. Extreme care should be exercised not to get the fan belt too tight.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Check throttle valve openings.
10. Check choke valve for position.
11. Check high tension wiring.
    Note: Be sure that high tension lead from the coil to the distributor does not leak current through its insulation to the inside of the metal wall of the conduit on 1925-27 eight cylinder models.
12. Adjust carburetor.
13. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load condition.

Ragged Idle

Spark Plug Gap Adjustment.—The motor will not idle properly if the spark plug electrodes are spaced unevenly. On low compression motors—1925-27 models—set spark plug gaps to not less than .023″ nor more than .025″. The plug gaps on later models with high compression motors should be set within the limits of from .025″ to .028″. The most important point when setting the spark plug gaps for all Jordan motors is to see that all gaps are evenly spaced.

Worn Distributor Shaft Bushing or Shaft.—A poor idling condition may be caused by a worn distributor shaft bushing or a worn distributor shaft. This allows too much motion at the cam end of the distributor shaft causing a variable contact point opening which results in erratic operation of the engine at low speeds. To correct this trouble, replace the worn parts with new ones.

On 1925-27 eight cylinder motors, the distributor is driven by a gear on the end of the generator shaft. These gears should be packed with a light grade of cup grease soft enough to follow the gears when in operation. Jobs will be encountered where someone has packed these gears with a very heavy cup grease and in some cases a channel is cut in the grease which will allow the gears to run dry and wear out. When this trouble is encountered, the heavy cup grease should be removed and replaced with grease of the proper consistency. This is an important point since these gears will wear out rapidly if not properly lubricated.

Poor Acceleration

Inactive Governor.—On 1927-28 six cylinder motors and 1928-30 eight cylinder motors, poor acceleration and loss of power may be due to an inactive governor. The distributor governor is lubricated by means of a felt pad located at the top of the distributor shaft directly under the rotor. If this pad is not well oiled regularly, the governor may stick, thus preventing the proper spark advance at high speeds. To free up, remove the distributor breaker assembly and lubricate the governor at the same time working the counterweights back and forth. If this fails to correct the trouble it will be necessary to remove the counterweight shaft assembly and replace with new parts or make proper repairs.

Another cause for governor failure is a worn pin (B) Fig. 1 in the counterweight or a condition caused by spring (A) slipping out of its position or losing its tension.

If the trouble should be caused by the pin working loose in the weights, it will be necessary to replace the governor weight with a new part. If the trouble is caused by the governor spring (A) either working out of place or losing its tension replace as follows: Install the spring in such a way that the outer end rests on the boss which is cast in the counterweight for this purpose. The inner end of the spring should rest in the slot of the screw around which the counterweight moves. Turning this screw will increase or decrease the tension on the spring. Adjust to a tension just

sufficient to hold the upper end of the governor weight against the distributor shaft with a slight pressure

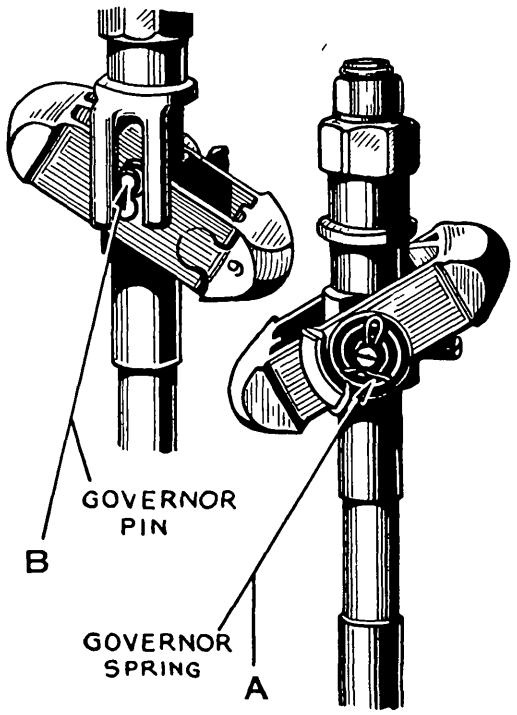


Fig 1

View of governor assembly used in Auto Lite distributors showing a governor spring (A) and governor pin (B) If the governor pin should work loose in the governor weight it will be necessary to replace the weight

OIL PRESSURE

Model and Year	Min	Max
K, L–1925	10 lbs at 15 M P H	
A–1925	5 lbs	40 lbs
J–1926	5 lbs	40 lbs
A–1926	5 lbs	40 lbs
J–1927	5 lbs	40 lbs
AA–1927	5 lbs	40 lbs
R–1928	5 lbs	40 lbs
RE–1928	5 lbs	40 lbs
JE–1928	5 lbs	40 lbs
E–1929	5 lbs	40 lbs
G–1929	5 lbs	40 lbs
70, 80–1930	5 lbs	40 lbs
90–1930	5 lbs	40 lbs

IGNITION TIMING

Jordan Model K, L and A 1925, Line Eight and Great Line Eight 1926.—The contact points should just start to separate when the flywheel mark DC is at the pointer in the peekhole of the flywheel housing with piston No 1 on compression stroke, spark lever in one-half advance position The ignition timing can be adjusted by loosening the advance lever clamp screw and rotating the distributor body A clockwise movement retards the spark and a counter-clockwise movement advances the spark

Ignition Timing Table

The following table contains ignition timing data for all models of Jordan from 1925 to 1930 inclusive

YEAR	MODEL	IGNITION TIMING			PLUG GAP	FIRING ORDER
		Con Pt Clear	Fly Wheel Travel	Spark Lever Position		
JORDAN						
1925	K L	020″	*T D C	½ Adv	025″	1 5-3 6-2-4
1925	A	018″	*T D C	½ Adv	025″	1-6 2-5-8-3-7-4
1926	J (Line Eight)	018″	*T D C	½ Adv	025″	1-6-2 5-8-3-7-4
1926	A (Great Line Eight)	018″	*T D C	½ Adv	025″	1-6-2-5-8-3-7-4
1927	J (Line Eight)	018″	*1½″ B	Adv	030″	1 6-2 5 8-3-7-4
1927	AA (Great Line Eight)	018″	*1½″ B	Adv	030″	1-6-2 5-8-3-7-4
1928	R	018″	*1⅜″ B	Adv	030″	1 5 3-6-2-4
1928	RE	018″	*1⅜″ B	Adv	030″	1-5-3 6-2-4
1928	JE (Air Line 8)	018″	*1½″ B	Adv	030″	1-6-2 5-8-3-7-4
1929	E	024″	*IGN	Adv	030″	1 5-3 6-2-4
1929	G	024″	*IGN	Adv	030″	1-6-2 5-8-3-7-4
1930	70 80	020″	*IGN	Adv	030″	1 6-2-5-8-3 7-4
1930	90	024″	*IGN	Adv	030″	1 6-2 5-8-3-7-4

Adv —Spark fully advanced B —Before top dead center T D C — Top dead center
*Top dead center is indicated by the mark D C on the flywheel On the later models an ignition timing mark IGN appears before the D C mark and indicates the firing position for No 1 cylinder

Jordan Line Eight and Great Line Eight 1926-27 and R, RE and JE (Air Line Eight) 1928 and Model E 1929.—The contact points should just start to separate when the mark IGN on the flywheel is at the pointer in the flywheel housing with No 1 piston at the top of compression stroke, spark lever in full advanced position Ignition timing adjustment can be made by rotating the distributor body

Jordan Model G 1929 and Great Line Eight 90 1930.—The ignition system used on these models have two ignition coils and a distributor with double breaker arms which are operated by a four lobe cam The contact points break alternately, the fixed set of points and one coil supplying current for cylinders 1-2-8-7 and the movable points and second coil supplying ignition to cylinders 6-5-3-4

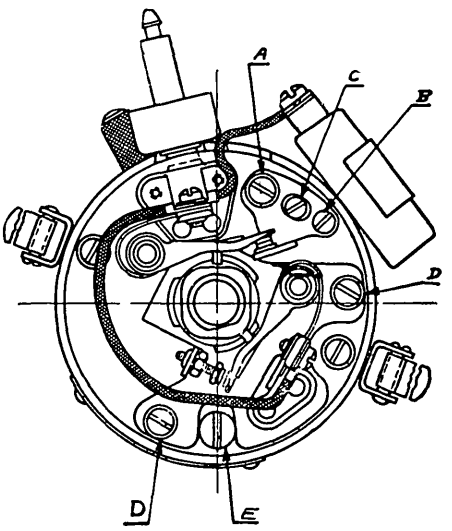


Fig 2

Top view of Auto Lite distributor IGH with double breaker arms and 4 lobe cam To synchronize the contact points use Auto-Lite synchronizing tool shown in Fig 3

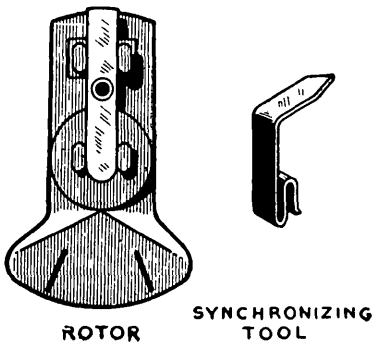


Fig 3

View of distributor rotor and synchronizing tool used on Auto-Lite Model IGH distributors Note the two synchronizing marks on the fan tail of the distributor.

To time the ignition, first set both sets of points at .024" and fully advance the spark. Crank the motor until No. 1 piston is approaching top dead center of the compression stroke. Continue cranking until the flywheel mark 1-IGN is opposite the pointer on the flywheel housing. With the piston set in this position, the fixed set of points should just start to separate with the distributor rotor pointing to No. 1 spark plug contact. The ignition timing can be changed by rotating the distributor housing.

Jordan Models 70 and 80 (T) 1930.—Auto-Lite distributors with two sets of contact points operated by a four lobe cam are used on these models. The fixed set of breaker points fire cylinders 1-2-8-7 and the movable points fire cylinders 6-5-3-4.

To time the ignition to the motor, set both contact point gaps at .024". Crank the motor until No. 1 piston is approaching top dead center of the compression stroke. Continue cranking until the ignition mark 1-IGN on the flywheel is opposite the pointer in the flywheel housing. At this point the stationary set of contact points should just start to separate with the spark lever in the fully advanced position. The ignition timing can be adjusted by rotating the distributor housing. Movement in a clockwise direction retards the spark and in a counter-clockwise direction advances the spark. A test lamp or ammeter will be helpful in determining the exact instant that the stationary set of contact points open.

To Synchronize Eight Cylinder Auto-Lite Distributors With Four Lobe Cam.—On Auto-Lite IGH distributors one set of points is carried on a main breaker plate assembly and the other set is carried on a sub plate mounted on the main plate. To synchronize, first adjust both sets of points to the proper clearance. (See Ignition Timing Table). The fixed breaker points are adjustable for gap openings by loosening the lock screw (A) Fig. 2 and the pivot screw (B) and adjusting with eccentric screw (C). After obtaining the correct gap, be sure both screws (A) and (B) are tight. Adjustment of the gap for the sub-plate breaker points is made by the conventional screw point and lock nut.

To synchronize the two sets of points, first insulate the sub-plate points from each other by placing a thin piece of fiber between them. Then crank the engine until the breaker points just open. This can be indicated by a timing light connected across the breaker arm and to ground. The points should be adjusted so that the timing light will light when the breaker cam backlash is turned in the direction of drive and go out when the backlash is turned against rotation.

On the top of the fan tail of the rotor will be found two timing marks 45 degrees apart (left view Fig. 3). With the rotor backlash taken up in the direction of drive place the synchronizing gauge (right view Fig. 3) on the edge of the distributor base so that the point is exactly in alignment with the clockwise line on right hand rotation distributors, or with the counter-clockwise line for left hand distributors. Next crank the engine until the other timing line on the distributor rotor is exactly in alignment with the point of the synchronizing gauge. Make sure that any backlash in the rotor is taken up in the direction of drive.

With the distributor rotor in this position, the sub plate point should be adjusted so that the timing light will light when the breaker arm backlash is turned in the direction of drive and go out when the backlash is turned against rotation. Before this test can be made the fiber between the sub plate points should be removed and inserted between the other set of points.

The sub plate points can be adjusted by loosening the two lock screws (D) Fig. 2 and rotating the sub plates with the eccentric screw (E) until the proper setting is obtained.

After synchronizing the two sets of points, turn the engine over a few times and recheck to make sure the exact setting has been obtained.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for all models of Jordan from 1925 to 1930 inclusive All tappet adjustments are given for hot motor unless otherwise designated

YEAR	MODEL	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int Valve	Exh. Valve
		Int	Exh	Int	Exh				
JORDAN									
1925	K L		0075″	004″C	006″C	*8°A			Closes
1925	A		0075″	004″	006″	*8°A			Closes
1926	J (Line Eight)		0075″	004″	006″	*8°A			Closes
1926	A (Great Line Eight)		0075″	004″	006″	*8°A			Closes
1927	J (Line Eight)		0075″	004″	006″	*8°A			Closes
1927	AA (Great Line Eight)		0075″	004″	006″	*8°A			Closes
1928	R		0075″	005″	006″	*5°A			Closes
1928	RE		0075″	005″	006″	*1-E.C.	..		Closes
1928	JE (Air Line Eight)		0075″	004″	006″	*8°A			Closes
1929	E		0075″	004″	006″	*1-E C			Closes
1929	G		0075″	004″	006″	*1-E C			Closes
1930	70 80		912″	007″	008″	*1-E C			Closes
1930	90		0125″	007″	008″	*1-E C			Closes

A —After top dead center C —Cold setting
*The flywheel mark 1-E C should appear directly under the pointer when No 1 exhaust valve is just closed

Flywheel marks No. 1-E.C. for checking valve timing are provided for all models of Jordan. It will be noted in the Valve Timing Table that the exhaust valves close at different degrees of flywheel travel for the different models. However, the flywheel marks are provided for the location of these various positions.

Jordan All Models 1925-30.—A special valve tappet setting is used for checking the ignition timing on all models of Jordan. This valve tappet setting varies for the different models and will be found in the Valve Timing Table. After the valve tappets have been adjusted to the proper clearance for checking the timing, crank the motor until No. 1 piston just passes T.D.C. of the exhaust stroke and watch closely for the marks 1-E.C. When the mark exhaust closes is directly under the indicator the exhaust valve for No. 1 cylinder should just close. After the timing operation is complete, reset the valve tappets to correct clearance as given in the Valve Timing Table.

GAS LINE SCREENS

All models of Jordan equipped with vacuum tank fuel feed have two gasoline strainers in the gas line. One is located in the head of the vacuum tank as shown in Fig. 4 and the other is located at the carburetor. On models equipped with a gascolator located in the gas line at the top of the vacuum tank, a chamois skin strainer is used in the place of the screen in the head of the vacuum tank. This chamois skin is located in the gascolator and should be removed and cleaned at intervals.

To clean the strainer screen in the vacuum tank, disconnect the gas line from the gasoline supply tank and remove the elbow and bushing together with the gasoline strainer. Clean with air and gasoline.

All models of Jordan equipped with fuel pump feed have two gasoline strainers in the gas line; one is located in the top of the fuel pump bowl as shown in Fig. 5 and the other is located at the carburetor.

To clean the fuel pump strainer screen, remove the glass bowl and wash clean in gasoline. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new gasket.

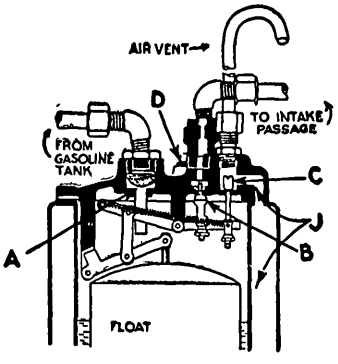


Fig. 4.

Upper half of vacuum tank showing position of gas line screens, to remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing. On Jordan cars equipped with a gascolator a chamois skin strainer will be found in the gascolator instead of the screen in the head of the gasoline tank

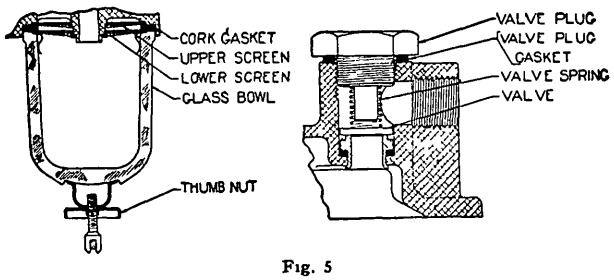


Fig. 5

Cross sectional view of fuel pump glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If valve plug is removed, see that valve plug gasket is in good condition when plug is replaced.

TIMING CHAIN ADJUSTMENT

Jordan Models K and L 1925.—To adjust the timing chain, loosen the two upper screws which hold the accessory housing to the timing chain case and move the distributor mounting and accessory shaft away from the motor until the backlash measures approximately 3/16″ on the rim of the fan pulley. By moving the accessory shaft back and forth, the amount of backlash can be determined. After completing this adjustment, tighten the anchor bolts securely to the timing chain case.

Jordan Models A, J and AA 1925-27; JE 1928-29 and G 1929.—To adjust the timing chain, loosen the two bolts which anchor the generator to the chain case. Loosen the lock nut on the adjusting screw which operates against the upper generator anchor bolts and remove the small cover plate on the front of the chain case cover directly opposite the generator. Turn the adjusting screw to the right, clockwise, until the chain deflection or slack measured through the cover plate hole is approximately ½″. Tighten adjusting screw lock nut and generator anchor bolts securely after making this adjustment.

Jordan Model R and RE 1928-29.—To check the timing chain adjustment, remove the small cover plate on the front of the chain case cover directly opposite the generator. With the crank, turn the motor over just enough to remove any slack in the chain between the camshaft and crankshaft sprockets. Grasp the accessory sprocket attaching nut with a pair of pliers and oscillate it or turn it back and forth. The movement should be from 1/16″ to ⅛″ on the edge of the sprocket. If the amount of movement is greater than ⅛″, adjust the chain by first loosening the two bolts which anchor the generator to the chain case; then loosen the lock nut on the adjusting screw which operates against the upper generator anchor bolts. Turn the adjusting screw to the right, clockwise, until the chain deflection or slack measured through the cover plate hole is approximately ⅛″. Tighten the adjusting screw lock nuts and generator anchor bolts securely after making this adjustment.

Carburetor Specifications

FLOAT LEVEL

All models of Jordan up to 1930 have been equipped with Stromberg carburetors. On some of the 1930 models Schebler carburetors are used as equipment.

When Stromberg carburetors are shipped from the Chicago factory, they are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When higher test (lower specific gravity) 68° to 70° Baumé fuel is used, the float level rises and by bending the float arm the gasoline level is brought back to normal. This information applies to Model U carburetors and a table giving the correct float levels for high and low test gasolines will be found on page 70 under the heading Affect of Fuel on Float Level.

Stromberg Carburetors

Stromberg Model O-2.—The fuel in the float bowl will stand at the correct level when the distance from the top of the float to the milled surface of the float chamber casting is 1". These carburetors also have a sight hole in the side of the bowl which is closed with a threaded plug. The gasoline level should stand exactly even with the bottom of this sight level hole when the plug is removed and the motor is not running.

To raise or lower the float level, remove the cap from the float chamber cover and the float needle stem will be seen. Hold the needle sleeve from turning by means of a small wrench against the flat side of the sleeve and screw the needle down clockwise, to lower the level. Screwing the needle up raises the level.

Stromberg Model OX-2.—The float level information for Stromberg Model OX-2 carburetors is the same as that for Stromberg Model O-2 above.

Stromberg Model UX-2.—The fuel in the float chamber bowl will stand at the correct level when the top of the float is 3/64" from the lower surface or gasket face of the float chamber cover. The float level adjustment can be changed by bending the float lever arm. To raise the float level, bend the arm upward; to lower the float level, bend the arm downward.

Stromberg Model UU-2.—The gasoline level in the float bowl will stand at the correct height when the distance from the top of the float to the bottom face of the float chamber cover is 7/32". These carburetors also have a sight hole closed by means of a plug in the side of the bowl. The level of gasoline should stand exactly even with the bottom of this sight level hole with the plug removed and the engine not running. To adjust the float level, bend the float lever arm up to raise and down to lower the fuel level.

CARBURETOR SPECIFICATION DIAGNOSIS

Carburetor Specification Information.—Jordan automobiles have come equipped with Stromberg carburetors from 1925 to 1930 inclusive. The year, car model and carburetor model will be found in the Motor Specification Table in the Carburetor Adjustment section.

The jet specification information for each model of car will be found in the following paragraphs under the heading of the carburetor. Information on jet measurements will be found below.

Jet Measurements.—All jet and nozzle measurements for all models of Stromberg used on Jordan cars are given either in wire drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch and metric drill sizes is given below.

Drill Table

The following table contains twist drill and steel wire gauge sizes and areas together with nearest equivalent metric sizes.

Drill No	Dia. In	Area, Sq In	Nearest Metric Size, MM	Dia., In	Area, Sq In	Drill No	Dia. In.	Area Sq. In	Nearest Metric Size, MM.	Dia., In.	Area, Sq. In.
1	2280	04082	5 8	2298	04093	41	0960	00723	2 45	.0965	00731
2	2210	.03835	5 6	2205	03819	42	0935	00686	2 35	0925	.00672
3	2130	03563	5 4	2127	03553	43	0890	00622	2 25	0886	.00617
4	2090	03430	5 3	2087	03421	44	0860	00580	2 20	.0866	.00589
5	2053	03316	5 2	2047	03291	45	0820	00528	2.10	.0827	.00537
6	2040	03268	5 2	2047	03291	46	0810	00515	2 05	.0807	.00512
7	.2010	03173	5.1	2008	03167	47	0785	00483	2 00	0787	.00486
8	1990	03110	5 .	2008	03167	48	0760	00453	1.95	.0768	00463
9	.1960	03017	5 0	1969	03039	49	0730	00418	1.85	.0728	00416
10	.1935	02942	4 9	1939	02915	50	0700	00384	1.80	.0709	.00395
11	.1910	02865	4 9	1929	02918	51	0670	00352	1.70	.0669	00352
12	1890	02805	4 8	1890	02805	52	0635	00316	1.60	0630	00312
13	.1850	02688	4 7	1850	02688	53	0595	00278	1 50	0591	00274
14	.1820	.02601	4 6	1811	.02576	54	0550	00237	1.40	.0551	.00238
15	.1800	02544	4 6	.1811	02576	55	0520	00212	1 30	.0512	00206
16	1770	02460	4 5	1772	02456	56	0465	00169	1 20	0472	00178
17	1730	02350	4 4	1732	02356	57	0430	00145	1.10	0433	.00147
18	1695	02256	4 3	1693	02251	58	0420	00138	1 05	0413	00134
19	.1660	02164	4 2	1654	02149	59	0410	00132	1 05	0413	00134
20	1610	02035	4 1	1614	02046	60	0400	00125	1 00	0394	00122
21	1590	01985	4 0	1575	.01948	61	0390	00119	1 00	.0394	00122
22	1570	01936	4 0	1575	01948	62	0380	00113	95	0374	.00110
23	1540	01862	3 9	1535	01851	63	0370	00107	95	0374	.00110
24	1520	01814	3 9	1535	01851	64	0360	00101	90	0354	.00098
25	1495	01755	3.8	1496	01758	65	0350	00096	90	.0354	00098
26	1470	01697	3 7	1457	.01667	66	0330	00085	85	.0335	.00088
27	1440	01628	3 7	1457	01667	67	0320	00080	80	0315	.00078
28	1405	01550	3 6	1417	01577	68	0310	00075	80	0315	00078
29	1360	01452	3 5	1378	01491	69	0292	.00067	75	0295	.00068
30	1285	01296	3 3	1299	01325	70	0280	00061	.70	.0276	00060
31	1200	01130	3 0	1181	01094	71	0260	00053	65	0256	.00051
32	1160	01056	2 9	1142	01024	72	0250	00049	65	.0256	00851
33	1130	01002	2 9	1142	01024	73	0240	00045	60	0236	00044
34	1110	00967	2 8	1102	00954	74	0225	00039	55	0217	00037
35	1100	00950	2 8	1102	00954	75	0210	00034	55	0217	00037
36	1065	00890	2 7	1063	00887	76	0200	00031	50	0197	00030
37	1040	00849	2 6	1024	00824	77	0180	.00025	45	0177	00025
38	1015	00809	2 6	1024	00824	78	0160	00020	40	0157	00019
39	0995	00777	2 5	0984	00760	79	0145	00016	35	0138	00013
40	0980	00754	2 5	0984	00760	80	0135	00014	35	0138	00015

Specification Diagnosis

(Stromberg Model O-2 and OX-2)

There are six points at which the internal carburetor calibration specifications of a Stromberg Model O carburetor used on Jordan may be changed to affect its operation. These carburetors are properly calibrated when they leave the factory. However, jobs may be encountered where someone unfamiliar with the correct carburetor calibration procedure has changed the carburetor by drilling out or soldering up openings and in some cases by changing the size of jets. A change

in any of these parts may throw the carburetor out of balance, causing trouble which can easily be identified by the mechanic if the symptoms are known. Complete specification diagnosis information will be found under the heading Carburetor Specification Diagnosis under Stromberg Model O in the Stromberg section in the back of the book. In this section will be found complete information giving symptoms, diagnosis and test where trouble has been caused as the result of jet changes.

Specification Tables.—The following tables contain the specification data for all models of Jordan using Stromberg O carburetors from 1925 to 1930 inclusive. The tables are arranged by car model.

Jordan K and L 1925

(Stromberg O-2 Engine Cont. 6S, 3 5/16"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#52
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#56
Main Discharge Jet	.....	‡#A–30, #B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#28, #32
Accelerating Well Discharge Jet	.....	#54
Venturi	1 1/32"	.....

*This carburetor has one idle opening above the throttle.
†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size.
‡First bore of main discharge jet is #30 wire drill; second bore #18 wire drill.

Jordan A 1925-26

(Stromberg OX-2 Engine Cont. 9K, 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#60
Main Discharge Jet	.....	‡#A–38, #B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#30, #34
Accelerating Well Discharge Jet	.....	#54
Venturi	1 5/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #54 wire drill size.
†This is a double end bleeder having one end #32 wire drill size and other end #34 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill.

Jordan J 1926-27

(Stromberg OX-2 Engine Cont. 8S, 2⅞"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#52
Main Discharge Jet	.....	‡#A–38, #B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#30, #34
Accelerating Well Discharge Jet	.....	#54
Venturi	1 3/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #56 wire drill size.
†This is a double end bleeder having one end #30 wire drill size and other end #34 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill

Jordan AA 1927

(Stromberg OX-2 Engine Cont. 9K, 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#60
Main Discharge Jet	.....	‡#A–38, #B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#30, #34
Accelerating Well Discharge Jet	.....	#54
Venturi	1 5/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #54 wire drill size.
†This is a double end bleeder having one end #30 wire drill size and other end #34 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill.

Jordan R 1927-28

(Stromberg OX-2 Engine Cont. 12E, 3¼"x4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	#56
Main Discharge Jet	.....	‡#A–43, #B–28
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	1 3/32"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #56 wire drill size.
†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.
‡First bore of main discharge jet is #42 wire drill; second bore #28 wire drill.

Specification Diagnosis

(Stromberg Model TXV-2)

Stromberg Model TXV-2.—All model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and high speed air bleed but all specifications as to principle of operation and jet diagnosis are the same. Complete jet specification diagnosis information will be found in the Stromberg section in the back of the book.

The following tables contain specification data for this carburetor as used on Jordan.

Specification Table.—The following table contains jet specification data for Stromberg Model TXV-2 carburetor as used on Jordan.

Jordan R 1928-29

(Stromberg TXV-2 Engine Cont. 14E, 3⅜"x4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")	.....	Blank
Main Discharge Jet	.....	‡#A–38, #B–18
High Speed Air Bleeder	.....	#70
Accelerating Well Bleeder	.....	†#28–#32
Accelerating Well Discharge Jet	.....	#54
Venturi	1 3/32"	.....

*The idle jet above the throttle is a #70 wire drill size; the jet below the throttle is a #54 wire drill size.
†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size.
‡First bore of main discharge jet is #38 wire drill; second bore #18 wire drill.

Specification Diagnosis

(Stromberg Model OO-2)

Stromberg Model OO-2.—This carburetor is made in the 1¼" size only, and follows the construction of the Model T series carburetors as to the float mechanism, venturis and jets. It has a single high speed needle adjustment which regulates a fuel orifice in series with two metering jets each of which feeds one barrel of the main discharge jet. The idling adjustments which are individual for each barrel are different from those of other models in that they employ needles regulating the upper idle discharge holes, the one above the throttle valve, and thereby regulates the mixture from the minimum idling speed up to about 10 miles per hour while the mixture from 10 to 18 miles per hour is regulated by the size of the fuel and air bleeder orifices in the idling tube.

A complete description of the idling system and diagnosis information for all calibrated parts will be found under the heading Carburetor Specification Diagnosis for Model OO-2 carburetors in the Stromberg section in the back of the book.

The following table contains specification data for the Model OO-2 carburetor as used on Jordan.

Specification Table.—The following specification table contains specification data for Stromberg Model OO-2 carburetors on Jordan automobiles in 1928 and 1929.

Jordan JE 1928-29

(Stromberg OO-2 Engine Cont. 15S, 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets (Top holes)	.....	*#56
Idle Discharge Jets (Lower 2 holes)	.....	*#56
Main Metering Jet		Adjustable
Economizer Needle Valve	.....	.....
Main Discharge Jet	.....	‡#A–28, #B–20
High Speed Air Bleeder	.....	#70
Accelerating Well Bleeder	.....	†#43
Accelerating Well Discharge Jet	.....	#53
Venturi	31/32"	.....

*The idle jet above the throttle is a #56 wire drill size; the jets below the throttle are #56 wire drill size.
†This is a fixed bleeder.
‡First bore of main discharge jet is #28 wire drill; second bore #20 wire drill. Two jets are used; one for each barrel.

Specification Diagnosis

(Stromberg Model U-2 and UX-2)

Stromberg U.—These carburetors are chiefly characterized by a special form of accelerating pump. The smaller sizes of this series have the single venturi tube and an inclined main discharge jet and are usually fitted with fixed size metering jets. A gasoline economizer device is also used.

Complete information and cross section views of this type of carburetor will be found under Stromberg Model U in the Stromberg section in the back of the book. In this section will also be found complete specification diagnosis information under the heading Carburetor Specification Diagnosis for all changes in jet sizes that may give trouble. Before attempting to diagnose or correct any condition of trouble, thought to be in the carburetor, read carefully the section referred to above in the back of the book.

The following tables contain specification data for Stromberg Model U carburetor as used on Jordan 1929.

Specification Tables.—The following tables contain specifications for Stromberg Model UX-2 as used on Jordan 1929 automobiles.

Jordan 70, 80 (T) 1930

(Stromberg U-2 Engine Cont. 17S, 2⅞"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#66
Main Metering Jet	.....	.....
High Speed Needle Valve (open No. notches)		Adjustable
By-Pass Jet	.031"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#65
Pump Reducer	.....	#68
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/16"	.....

*The idle jet below the throttle is #55 wire drill size; the jet above the throttle is #66 wire drill size.

Jordan E 1929

(Stromberg UX-2 Engine Cont. 18C, 3⅜"x4⅝")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#68
Main Metering Jet	.....	.....
High Speed Needle Valve (open No. notches)		Adj. on Right
By-Pass Jet	.040"	.....
Main Discharge Jet	.....	#40
High Speed Air Bleeder	.....	#56
Pump Reducer	.....	#62
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/16"	.....

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #68 wire drill size.

Specification Diagnosis

(Stromberg Model UU-2)

Stromberg Model UU-2—The UU Twin carburetors have the same float mechanism, venturi, main discharge jets and idle systems as the Model OO-2 but carry the accelerating pump and economizer of the Model U series. A needle adjustment is supplied to control the pump action. Its setting ranging from one half turn open in the summer to three turns open in the winter. Plug type metering jets of the Model U series are employed.

A complete description and diagnosis information will be found in the Stromberg section in the back of the book. This section should be referred to before attempting to correct any trouble that might be thought to exist in the carburetor.

The following tables contain specification data for Stromberg UU-2 carburetors used on Jordan automobiles.

Specification Tables.—The following specification tables contain carburetor specifications for Stromberg UU-2 carburetors used on Jordan 1929 and 1930 models.

Jordan G 1929-30

(Stromberg UU 2 Engine Cont 15S, 3"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets (Top 1 hole)		*#56
Idle Discharge Jets (Lower 2 holes)		*#56
Main Metering Jet	042"	
High Speed Needle Valve (open No notches)		
By Pass Jet		
Main Discharge Jet		†#A–28, #B–20
High Speed Air Bleeder		#70
Pump Reducer		#70
Accelerating Nozzle		
Venturi Tube (size in inches)	1"	

*The idle jets below the throttle are #56 wire drill size the jet above the throttle is # 56 wire drill size
†First bore of main jet is a #28 wire drill second bore is a #20 wire drill Two jets are used one for each barrel

Jordan 90 1930

(Stromberg UU-2 Engine Cont 15S, 3 'x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets (Top 1 hole)		*#56
Idle Discharge Jets (Lower 2 holes)		*#56
Main Metering Jet	042"	
High Speed Needle Valve (open No notches)		
By-Pass Jet		
Main Discharge Jet		†#A–28, #B–20
High Speed Air Bleeder		#70
Pump Reducer		#70
Accelerating Nozzle		
Venturi Tube (size in inches)	1"	

*The idle jets below the throttle are #56 wire drill size, the jet above the throttle is #56 wire drill size
†First bore of main jet is a #28 wire drill second bore is a #20 wire drill Two jets are used one for each barrel

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor

Car and Year	Model	Engine	No Cyl	Bore and Stroke	Carb Model and Size
JORDAN					STROMBERG
1925	K L	Cont 6S	6	3 1/16"x4¾"	O 2
1925 26	A	Cont 9K	8	3"x4¾"	OX 2
1926 27	J	Cont 8S	8	2⅞"x4¾"	OX 2
1927	AA	Cont 9K	8	3"x4¾"	OX 2
1928	R	Cont 12E	6	3¼"x4"	OX 2
1928 29	RE	Cont 14E	6	3⅜"x4"	TXV 2
1928 29	JE	Cont 15S	8	3 x4¾"	OO 2
1929	E	Cont 18C	6	3⅜"x4⅝"	UX 2
1929 30	G	Cont 15S	8	3"x4¾	UU 2
1930	70 80(T)	Cont 17S	8	2⅞ x4¾"	U 2
1930	90	Cont 15S	8	3"x4¾"	UU 2

Stromberg Model Numbers

How to Read Stromberg Model Numbers.—The first letter of a Stromberg model designation indicates the type The following letter indicates some special form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor The size starting from 1" which is No 1 and increasing in ¼" steps For example, take a Model U type carburetor A U 1 has a 1" throat while a U-2 has a 1¼" throat The actual diameter of the carburetor opening is 3/16" greater than the nominal rated size in accordance with the standard of the Society of Automotive Engineers

An "X" in the model symbol indicates that the carburetor flange bolt holes are at right angles to the air entrance and the float chamber The carburetor being usually installed so that the throttle shaft is parallel to the engine crankshaft and the line of the intake manifold The letter "V" in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as TV or TXV

ADJUSTMENT PRECAUTIONS

A correct carburetor adjustment cannot be obtained on any model of Jordan unless the motor is thoroughly warmed up It is advisable to idle the motor at least 10 minutes before attempting a carburetor adjustment

Manifold Affect on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor Take for example an adjustment from a rich to a lean mixture, the tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained

Auxiliary Needle Valve Held Open—On cars equipped with Stromberg Model U carburetors, low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever thus holding the auxiliary needle valve open

To correct, set the auxiliary control lever cam so that there is approximately 1/16" clearance between the cam and the auxiliary control lever

Idle Adjustment.—When adjusting Twin type carburetors it should be borne in mind that the idling system on this type of carburetor is different from that on the conventional single barrel type The difference lies in the fact that the idling adjustment controls the upper idling opening above the throttle and operates to control the amount of air and gasoline that enters the carburetor barrel at this point A complete description of the idling system used on these types of carburetors will be found in the Stromberg section in the back of the book

STROMBERG MODEL O-2

Stromberg Model O-2 carburetors used on early model Jordan cars was of the plain tube type so called because having no air valve or metering needles both the air passage and gasoline jets are of fixed size for all engine speeds This carburetor was equipped with one idling opening above the throttle with separate adjustment for idling the motor, an accelerating well which supplied extra fuel for acceleration as the throttle was opened, an

economizer needle which permits the carburetor to operate on a very lean and economical mixture at the closed throttle position of average driving but automatically lifts to the richer setting when the full power of the motor is called for.

Carburetor Adjustment.—These carburetors have two adjustments; the idling and high speed. Complete adjustment information will be found in the Stromberg section in the back of this book under the heading Stromberg Model O Carburetors.

STROMBERG OX-2

These carburetors are of the plain tube type having no air valves or metering needles; both the air passages and gasoline jets are of fixed size for all engine speeds. The carburetor is provided with an idling jet above the throttle with separate adjustment for idling the engine; an accelerating well which gives an extra supply of fuel just for a moment as the throttle is opened; an economizer which permits the carburetor to operate on a very lean and economical mixture at the closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the engine is called for.

Carburetor Adjustment.—This carburetor has two adjusting needles; one the idling adjustment and the other the high speed adjustment. Complete adjustment information will be found in the Stromberg section under the heading Stromberg Model O in the back of this book.

STROMBERG OO-2

The Model OO is a Twin or Duplex carburetor employing standard Stromberg construction along with the following improvements:

A single high speed adjustment operating equally on both barrels; individual idle adjustment for each barrel; a thermostat control of the accelerating well which automatically gives best operation at both warm and cold temperatures; a warming up control of the high speed needle when the choke is operated which gives improved starting and warming up.

Carburetor Adjustment.—Complete information for adjustment of the carburetor through its complete range of operation will be found under the heading Stromberg Model OO-2 in the Stromberg section in the back of this book.

STROMBERG TXV-2

The Model TX is a plain tube carburetor very similar to the Model O and contains the following special features:

Idle and low speed fuel jets above the throttle with separate idle adjustment; an accelerating well which gives an extra supply of fuel just for a moment after the throttle is opened; an economizer which permits the carburetor to operate on a very lean and economical mixture at closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the engine is called for; and a new type of warming up control which gives improved starting ability and unusually smooth operation after starting while the engine is cold.

Carburetor Adjustment.—Complete carburetor adjustment information for Model TX carburetors will be found in the adjustment section in the Stromberg section in the back of this book.

STROMBERG U-2

The U carburetor is of the plain tube type and contains the following special features:

A new warming up control which gives improved starting ability and unusually smooth operation after starting while the engine is still cold; a new positive acting accelerating device consisting of a pump which delivers an accelerating charge immediately the throttle is moved and meters and delivers this charge over a definite period of time; idle and low speed jet above the throttle with separate idle adjustment; an economizer which permits the carburetor to operate on a very lean mixture at the closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the engine is called for.

Carburetor Adjustment.—This carburetor has a low speed or idling adjustment and may have an adjustable type high speed adjustment; however, in most cases the high speed metering jet will generally be found to be set. Adjustable type metering jets may be obtained if desired. For complete carburetor adjustment information see Stromberg Model U in the Stromberg section in the back of this book.

STROMBERG UU-2

The Model UU-2 is a Twin Duplex carburetor employing the standard Stromberg construction together with the following improvements:

A new warming up control which gives improved starting ability and unusually smooth operation after starting while the engine is still cold; a new positive acting accelerating device consisting of a pump which delivers an accelerating charge immediately the throttle is moved and meters and delivers this charge over a definite period of time; idle and low speed jets above the throttle with separate adjustment for each barrel; an economizer needle which permits the carburetor to operate on a very lean mixture at the closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the engine is called for.

Two metering orifices which are calibrated at the factory to supply the proper amount of fuel at high and intermediate speeds of the engine for which the carburetor is intended are used. The size of the metering orifice is stamped on the outer face of the jet in decimal parts of an inch.

Carburetor Adjustment.—Complete carburetor adjustment for Stromberg UU-2 carburetors will be found in the Stromberg section in the back of this book.

Lincoln 1925-1930

Motor Tune-Up

A Lincoln automobile is equipped with an ignition system having a distributor with two sets of breaker arms and two ignition coils which form two complete ignition systems. The motor operates similar to two four cylinder motors. For this reason, synchronizing or timing of the distributor points to the motor is not quite so critical as on other models using a single coil and two breaker arms.

When the distributor points are not properly synchronized the trouble will not be so noticeable at low speeds but will cause the motor to vibrate at from 35 to 40 miles per hour when the car is suddenly accelerated. Another cause of rough running and vibration at speeds of 35 to 40 miles per hour may be due to one ignition coil being weaker than the other. This trouble should not be confused with improper synchronizing of the distributor points.

Due to the unrhythmic firing order of a Lincoln motor, an attempt at adjusting the carburetor for idling speeds should not be made when the car is idling at a slower speed than from 7 to 8 miles per hour.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: When making a chain adjustment on a Lincoln automobile, it should be borne in mind that the timing case is aluminum and has a greater coefficient of expansion than a steel case. For this reason, care should be exercised not to get the chain adjustment too tight when the motor is cold. The motor should be thoroughly warmed up before making the chain adjustment.
3. Synchronize distributor points.
4. Check ignition timing; adjust if necessary.
   Note: A special ignition timing setting should be used for anti-knock fuels (see Ignition Timing information).
5. Clean gas line strainers and screens; also check gas line for loose fittings.
   Note: The gasoline systems on all Lincoln automobiles have three gasoline strainers between the carburetor and the gasoline supply tank. It should be remembered that one of these strainers is located under the frame channel. (See information under Gas Line Screens).
6. Check fan belt; adjust if necessary.
   Note: On some 1928 models a condition may be encountered known as oscillating fan belt which might be confused with a condition of improperly synchronized ignition points. (See Oscillating Fan belt under Tune-Up Precautions below).
7. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
8. Check throttle valve opening.
9. Check choke valve for position.
10. Check manifold gasket; see that all manifold flange nuts are tight.
11. Check high tension wiring.
    Note: Care should be exercised not to pinch the high tension wiring insulation when replacing the conduit covers.
12. Adjust carburetor.
    Note: If trouble is experienced by the motor starving for gas at high speeds, see information under Float Level Adjustment.
13. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Tune-Up Precautions

Synchronizing of Distributor Points.—A rough running condition at from 35 to 40 miles per hour may be caused either by the distributor points not being properly synchronized or by one weak ignition coil.

Improperly timed or improperly synchronized distributor points on Lincoln cars do not give trouble at low speeds but affect the motor operation at speeds from 35 to 40 miles per hour. This condition is due to the fact that the Lincoln automobile has practically two ignition systems using a set of distributor points and a coil for each set of four cylinders.

Improperly synchronized distributor points can generally be indicated by a rough running condition which can be felt as a distinct vibration. To correct this trouble, retime the motor.

Oscillating Fan.—On some of the 1928 models a condition may be encountered known as an oscillating fan which might be confused with a condition where the ignition plugs are not properly timed or synchronized. While a condition of an oscillating fan will not cause the motor to vibrate exactly as improper timing would, the noise is similar and one who is not familiar with a Lincoln motor may confuse the two conditions by getting the impression that the noise heard is the result of motor vibration. A condition of oscillating fan is caused by the fan blades oscillating and can be corrected by replacing the original fan with a new one of heavier construction.

Spark Plug Gap Setting.—While a Lincoln motor is not sensitive to the spark plug gap setting, that is when the gaps are set within a tolerance of from .002" to .003" and a good grade of plugs is used, there are certain conditions where trouble may be experienced with the wrong setting. If the spark plug point gaps are set below .022", trouble may be experienced with a poor idling condition. If the spark plug gaps are set too wide, a popping back in the carburetor may be experienced on a hard pull. This trouble may be confused with carburetor trouble such as water in the carburetor bowl or a lean adjustment and can be identified by the fact that it occurs only on a hard pull while carburetor trouble may occur at any point within the range of operation.

Ragged Idle

Unrhythmic Firing.—Due to the design of a Lincoln motor a condition known as unrhythmic firing exists at very low engine speed and may be confused, by someone unfamiliar with a Lincoln motor, with some other trouble. In order to avoid customer complaints on idling, the motor should be set to idle at approximately from six to seven miles per hour road speed. After the speed of the motor passes this point, the unrhythmic firing order of the engine does not affect the vibration of the motor.

When tuning a motor the carburetor is the last unit that should be checked. Under no circumstances should the carburetor be changed or tampered with until after the ignition and valve timing and motor compression have been checked. Follow closely all recommendations relative to timing given in the Valve and Ignition Timing sections. If the trouble is finally traced to the carburetor, first make certain that the correct carburetor adjustments have been made (see carburetor adjustment instructions in the Carburetor Adjustment section). If the trouble still persists, remove and thoroughly clean all jets and passageways. If cleaning and adjusting the carburetor fails to eliminate the trouble, a poor idling condition may be caused by someone tampering with the idling openings. Turn to Idling Jets in the Carburetor Specification Diagnosis section in the Stromberg section in the back of this book.

Flat Spots

A condition of hesitation or flat spots at speeds from approximately 25 to 30 miles per hour may be experienced as the result of a sticking valve or water in the carburetor. These two causes for this trouble can be differentiated as follows: If the trouble is caused by a sticking valve, the car will not hesitate until after it is thoroughly warmed up. If the trouble is caused by a dirty float chamber or water in the float chamber, then the trouble will develop even while the motor is cold. These two conditions may also be confused with too lean a carburetor adjustment.

At high speeds, a flat spot may be the result of an improper float valve setting. The capacity of the float chamber on the carburetors used on Lincoln automobiles is such that the float must be correctly set in order to supply sufficient gasoline to the motor at high speeds. Jobs will sometimes be encountered where someone unfamiliar with the correct carburetor procedure for Lincoln motors has either changed the original float setting or has replaced the old float with a new one in which the float action is not sufficient to permit enough gasoline to enter the bowl to supply the motor at high speeds.

When installing a float valve assembly, extreme care should be exercised to see that the float valve seat has a sufficiently large opening to accommodate the gasoline supply of the motor. Also, if it should become necessary to change the float level, the float lever arm should be bent in such a way that for any given level the maximum float travel is permitted.

Starving of the motor due to improperly set float is generally indicated by a spasmodic flat spot or hesitation at high speeds due to the motor running out of gasoline.

Motor Starving on a Pull.—A condition of motor starving or running out of gasoline on a long pull may be caused by a gas saver of the type that is tapped into the vacuum tank suction line between the carburetor and the head of the vacuum tank. A gas saver should never be inserted in this section of the fuel feed line.

Poor Acceleration

Ignition Timing.—The flywheels of Lincoln automobiles are provided with two sets of ignition timing marks, one set indicates top dead center and the other set is for retarded ignition timing. When any standard grade of white gasoline is used, the ignition should be timed by the late marks. If anti-knock fuel is used, the ignition should be timed by the dead center marks. If anti-knock fuels are used in a motor timed by the retarded marks, the car will have poor acceleration and lack power. If white gasoline is used in a motor timed by the dead center marks, the motor may knock. (See Ignition Timing for correct timing procedure).

Sticking Distributor Governor.—A condition of poor acceleration may be caused by a sticking ignition governor. The symptoms of this condition are a sluggish motor and lack of power which may be confused with an incorrect carburetor adjustment such as too rich a mixture.

If the governor becomes stuck and cannot be released by suddenly accelerating the motor on a pull with full advanced spark, it will be necessary to remove and dismantle the distributor assembly in order to correct the trouble.

Defective Breaker Arms.—Poor acceleration and a loss of power may be caused by the sluggish action or failure of one of the contact arms. An inactive breaker arm will entirely cut out one bank of four cylinders. Whenever this trouble is encountered, the breaker arm pin should be carefully cleaned and a drop of light oil placed on the pin to relieve the trouble.

Low Gasoline Mileage

Low gasoline mileage may be caused by the carburetor auxiliary starting needle not seating properly. It sometimes happens that someone unfamiliar with the correct carburetor adjustment procedure may remove the dash control button on the rod and when it is reinstalled, shorten it up to the extent of where the auxiliary starting needle is held off its seat. If the customer complains of low gasoline mileage, check to see that the auxiliary needle is seating properly and that there is sufficient clearance between the needle and the lift lever.

Rolling and Loading

A condition of Rolling and loading on Lincoln automobiles equipped with vacuum tank feed which may occur regularly or spasmodically may be caused by a gasoline logged vacuum tank float. Whenever trouble of this nature is encountered and all adjustments have been correctly and properly made, the vacuum tank float should be checked.

OIL PRESSURE

Lincoln All Models 1925-30.—At engine idling speed the oil pressure should be just sufficient to force the pressure gauge indicator away from the stop about one-half graduation. The maximum pressure should be from 18 to 20 lbs. with the oil at the usual operating temperature of the motor.

IGNITION TIMING

Lincoln All Models 1925-30.—The distributor is equipped with two sets of breaker contacts operated by a four lobe cam. The high tension current is distributed by means of a double end rotor. Current from the right hand coil passes through the center terminal of the distributor head to the permanent center contact of the rotor. This current is interrupted by the right hand breaker or stationary set of points and delivers current to the right bank of cylinders numbers 1-3-7-5.

The left block of cylinders numbers 6-8-4-2 receives ignition current from the left hand coil from which the high tension lead is connected to the short screw terminal, near the center of the distributor head. Current from this coil passes through the distributor head ring and the permanent carbon contact brush to the opposite end of the rotor. This circuit is interrupted by the left hand breaker or adjustable set of points.

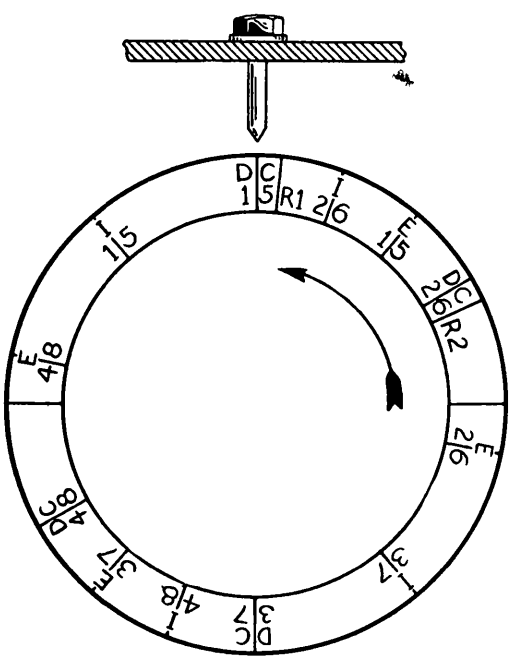


Fig. 1

Diagrammatic view of the timing marks stamped on Lincoln clutch ring. These timing marks are for timing the ignition, the valves and setting the valve tappet clearance.

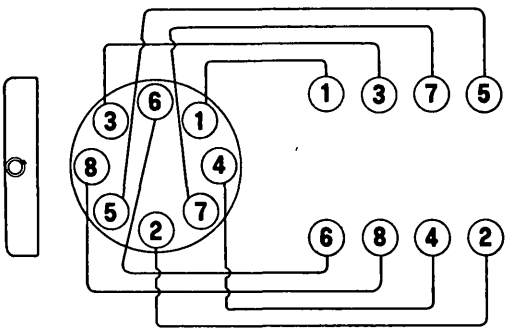


Fig. 2

Cut showing firing order of Lincoln motors. No. 1 is the first cylinder in the right bank next to the radiator.

To time the spark to the motor, both contact point gaps should first be equally spaced to .020" clearance. With the spark control fully retarded, crank the motor until No. 1 piston enters compression stroke. Continue to crank slowly until the vertical mark immediately in front of the letters R 1, Fig. 1, on the clutch ring is opposite the pointer. In this position, the right hand breaker points should just start to break contact.

The vertical line marked R 2 which immediately follows D.C.-2-6 is for setting the spark for the left block. Crank the motor until No. 2 piston enters compression stroke. The left hand breaker points should be adjusted so that they just break contact as the line R 2 comes under the pointer.

The above timing procedure is for motors using white gasoline. If anti-knock fuel is used, time the spark for both sets of cylinders to occur at top dead center.

The cylinders of a Lincoln motor are numbered according to their firing order and this number is stamped on the cylinder head near the spark plugs for that cylinder (see Fig. 2).

VALVE TIMING

Lincoln All Models 1925-30.—Crank the motor, watching exhaust valve in No. 1 cylinder, until mark I-I-5, Fig. 1, is directly under the pointer. With the flywheel in this position, set the valve tappet clearance for No. 1 intake at .005". Next crank the motor until E-I-5 comes under the pointer and set the exhaust valve clearance for No. 1 cylinder at .005".

The valve timing will be correct when No. 1 exhaust valve is just closing at top dead center of the exhaust stroke.

The valve tappet clearance should be adjusted by the flywheel marks which are stamped as follows: I-I-5, E-2-6, etc., and the adjustment should be made for each cylinder in the following order: 3-5-7-2-4-6-8. The correct tappet clearance for both intake and exhaust is .005".

CHAIN ADJUSTMENT

Lincoln All Models 1925-30.—The chain adjustment must be made with the motor stopped. To adjust the timing chain, remove the two nuts and locks which prevents the castellated bronze adjusting nut and its steel castellated lock nut from turning. Remove the hexagon plug from the right front side of the timing chain case. With one Spanner wrench hold the inner or bronze adjusting nut and with the other Spanner wrench loosen the outer or steel lock nut. By placing a finger on the chain through the plug hole in the front of the case, the amount of slack can be determined. Turn the inner or adjusting nut sufficiently either one way or the other until the up and down movement of the chain is approximately ½". When this adjustment has been completed, tighten the lock nut and replace the lock and nut previously removed. Also replace the plug in the front of the case. Before making a chain adjustment, the motor should be thoroughly warmed up and care should be exercised not to leave the chain with less than ½" up and down motion, since the timing chain case is made of aluminum and expands under the heat of operation to a point of where the chain may be too tight if sufficient play is not allowed.

GAS LINE SCREENS

Lincoln All Models 1925-30 are equipped with vacuum tank fuel feed and have three strainer screens in the gasoline line. One strainer is located in a sediment bowl which is in the left frame channel under the front floor board. A second one is located in the vacuum tank head, Fig. 3, while a third is located in the carburetor at the point where gasoline enters. These screens should be removed at intervals and thoroughly cleaned in gasoline and blown dry with compressed air.

The strainer screen in the sediment receiver which is in the frame channel screws into the bottom of the bowl and thus provides for the removal of the strainer. To remove the strainer from the carburetor, it is necessary to remove the carburetor. The shut off valve is under the vacuum tank and extends through the dash just above the toe board near the steering column.

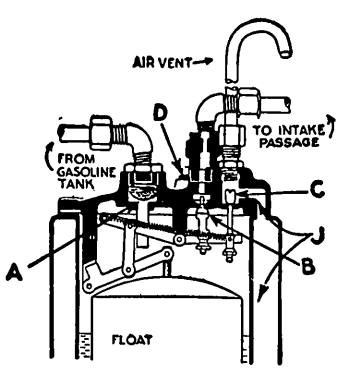


Fig. 3

Upper half of vacuum tank showing location of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

Carburetor Specifications

FLOAT LEVEL

Lincoln All Models 1925-30.—The fuel will stand at the correct level in the bowl when the top of the float is 1" below the top surface of the float chamber casting. The gasoline level can be checked by removing the plug from the sight level hole which is provided in the side of the float chamber bowl. With this plug removed, gasoline should stand even with the bottom of the hole.

Should the gasoline level require readjustment, remove the cap from the top of the float cover and the upper end of the float needle stem will be seen. Loosen the lock nut and hold the needle sleeve from turning by using a small wrench on the flat side. Turn the needle down (clockwise) to lower the level and up (counter-clockwise) to raise the level.

The float chambers of carburetors used on Lincoln automobiles are constructed in such a manner that the full range of float action must be obtained in order to prevent the motor from starving at high speeds. When making a float level adjustment, care should be exercised not to bend the float lever arm in any way to alter the full range of movement of the float when opening and closing the float valve. Also, if it should become necessary to replace the float valve assembly, care should be exercised to select a needle valve seat with an opening sufficiently large to accommodate the gasoline supply to the motor. (See special information under the heading Flat Spots at the front of this section).

CARBURETOR SPECIFICATION DIAGNOSIS

Lincoln automobiles have come equipped with Stromberg O series carburetors from 1925 to 1930 inclusive. This series of carburetors is characterized by the double venturi, a main discharge jet located in the center of the small venturi, the air bleed economizer and the manometer type of accelerating well.

If trouble is experienced in obtaining correct motor performance and the trouble is traced to the carburetor and cannot be corrected by adjustment, it may be that someone has tampered with the carburetor.

Remove the carburetor from the car and thoroughly clean all jets and passageways. Complete information explaining how to determine whether someone has tampered with or changed the carburetor calibration specifications will be found under Carburetor Specification Diagnosis in the Stromberg section under Stromberg Model O in the back of this book.

Specification Tables.—The following specification tables contain the carburetor specifications for Lincoln automobiles using Stromberg Model O carburetors.

Lincoln 8 Cyl. 1925-27

(Stromberg O 3 Engine 3⅛"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#46
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 3/8")		#54
Main Discharge Jet		‡#A-28, #B-9
High Speed Air Bleeder		
Accelerating Well Bleeder		†#32
Accelerating Well Discharge Jet		#53
Venturi	1¼"	

*This carburetor has only one idle jet located above the throttle
†This is a single end bleeder
‡First bore of main discharge jet is #28 wire drill second bore #9 wire drill

Lincoln 8 Cyl. 1927-29

(Stromberg O 3 Engine 3½"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jet		*#63-#52
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")		#60
Main Discharge Jet		‡#A-28, #B-15
High Speed Air Bleeder		
Accelerating Well Bleeder		†#28, #32
Accelerating Well Discharge Jet		#53
Venturi	1 5/16"	

*The idle jet above the throttle is a #63 wire drill size, the jet below the throttle is a #52 wire drill size
†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size
‡First bore of main discharge jet is #28 wire drill second bore #15 wire drill

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make model and size of carburetor

Car and Year	Model	Engine	No Cyl	Bore and Stroke	Carb Model and Size
LINCOLN					STROMBERG
1925 27	8 Cyl	Own	8	3⅛ x5"	O 3
1928 30	8 Cyl	Own	8	3⅛"x5"	O 3

ADJUSTMENT PRECAUTIONS

When adjusting the carburetor on a Lincoln automobile, care should be exercised to see that the radiator shutters are all working properly and that the motor is thoroughly warmed up After the motor is thoroughly warmed up, adjust the carburetor to where the motor runs satisfactorily on the service floor then take the car out on the road and complete the adjustment

To adjust for the best gasoline mileage, set the throttle lever until the motor runs at approximately a road speed of 20 miles per hour Turn the high speed adjustment down until the motor slows down appreciably then open the adjustment notch by notch until the motor performance ceases to be improved From this point turn the adjustment down two or three notches which should be the best point for gasoline economy

Another point which should be checked when the car owner complains of low gasoline mileage is the auxiliary starting needle When adjusting the carburetor, make sure that the auxiliary starting needle seats properly when the choker valve is fully opened If the dash control holds the auxiliary needle off its seat, too much gas will be by-passed into the main discharge jet with low gasoline mileage as the result

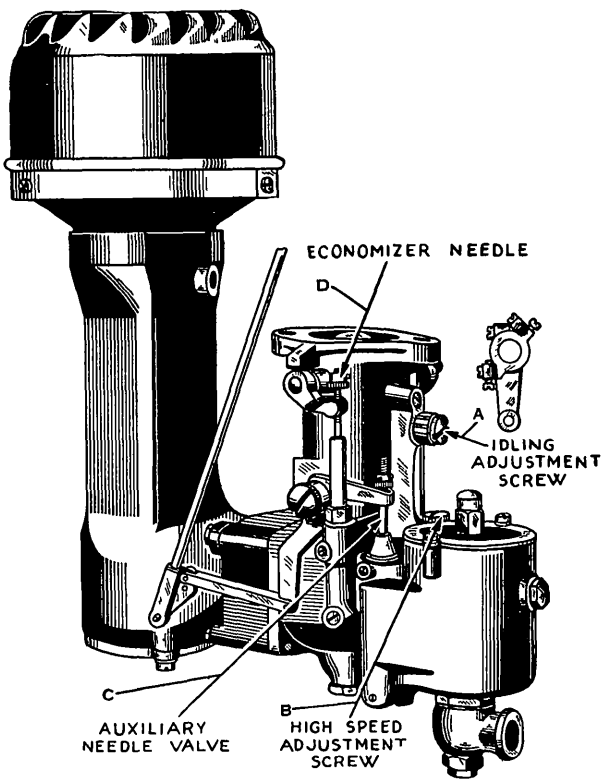


Fig 4

View of Stromberg Model O 3 showing high and low speed adjustments auxiliary starting needle and economizer needle

STROMBERG MODEL O-3

The carburetor used on Lincoln automobiles is the Stromberg Model O-3 It is of the plain tube type so-called because of having no air valve or metering needle Both the air passage and gasoline jets are of fixed size for all engine speeds The general features of this carburetor are a separate adjustment for idling the engine, an accelerating well which gives an extra supply of fuel for just a moment as the throttle is opened, and an economizer which permits the carburetor to operate on a very lean and economical mixture at the closed throttle position of average driving but automatically shifts to the richer setting needed when the full power of the engine is called for The carburetor also is provided with an enriching device which operates only with choke valve closed and gives the necessary richer mixture needed for starting in very cold weather

Carburetor Adjustment.—A view of the carburetor used on Lincoln automobiles showing both the high and low speed adjustments is shown in Fig 4 For complete adjustment information see Carburetor Adjustment under the heading Stromberg Model O in the Stromberg section in the back of this book

Marmon 1925-30

Motor Tune-Up

All Marmon motors equipped with double breaker ignition systems are critical on ignition timing. Care should be exercised not to confuse ignition trouble with carburetor trouble. If the points are not properly synchronized, the motor will run rough and the symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at low or idling speeds.

When adjusting the carburetor, see that the motor is thoroughly warmed up and that all other units such as spark plug points, contact points, ignition timing, etc., are properly and correctly adjusted. In every case, the motor compression should be checked before changing the carburetor adjustment.

Following the tune-up operations will be found special information covering motor tune-up which should be closely observed in order to obtain maximum motor performance.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Synchronize distributor points.
   Note: The above operation is necessary only on those models having distributors with two sets of breaker contacts.
3. Check ignition timing; adjust if necessary.
4. Adjust the valve tappets and free up valves; test motor compression.
5. Check fan and generator belts; adjust if necessary.
6. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
7. Check heat control valve.
8. Check throttle valve for opening.
9. Check choke valve for position.
10. Check manifold gasket; see that all manifold flange nuts are tight.
11. Check high tension wiring.
12. Adjust carburetor.
    Note: If trouble is experienced in obtaining an idle adjustment, the carburetor should be removed from the car and all jets and passageways thoroughly cleaned with gasoline and blown dry with air.
13. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Ignition Timing Not Properly Synchronized.—The ignition timing, contact points and spark plug gap setting are the most critical tune-up operations on Marmon motors. On models equipped with distributors having two breaker arms, special care should be exercised to see that the breaker arms are accurately synchronized. A poor idling condition is often the result of improperly synchronized points. The symptoms are similar to those caused by a too rich carburetor mixture and should not be confused with carburetor trouble. To correct this trouble, synchronize the contact points as described in the Ignition Timing section.

Spark Plug Gap Clearance.—Failure of the motor to idle may be caused by the spark plug gaps being set too close together. The plug gap clearance should be uniformly set to not less than .027" nor more than .032".

Warped Carburetor Flanges.—An erratic idling condition may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Care should be exercised in bolting the carburetor to the intake manifold to see that both sides come up evenly. Test the carburetor flange with a straightedge and if found to be out of true, square up with a flat mill file.

High Vacuum in Manifold.—A poor idling condition on deceleration may be caused by a high vacuum in the manifold above the throttle on cars equipped with Stromberg U carburetors. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to Roll and load will be noticed. In extreme cases, the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct the trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat on the same side of the throttle shaft and opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass jet.

Lack of Power

Timing.—Lack of power may be caused either by improper ignition or valve timing. Excessive wear in the generator couplings may cause the ignition timing to change in service. Check both the ignition and valve timing. (See Valve and Ignition Timing sections for timing information).

Low Gasoline Mileage

Carburetor Adjustment.—On models equipped with Schebler carburetors, the best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough from a lean mixture. Then richen up just to the point of where the motor runs smoothly. This is especially true of the idle and range adjustments and should be done with care for best results. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Motor Noise

Water Pump.—A sharp metallic squealing sound on Model 78 which may develop at any speed of the motor may be caused by the end of the water pump shaft bearing against the solid spacer washer in the recess of the pump housing. To correct this trouble, remove the pump shaft and grind two or three grooves diametrically across the end of the shaft. Grinding these grooves across the end of the shaft will reduce the bearing surface of the pump shaft against the housing and thus reduce the noise.

Distributor Shaft.—A shrill, dry, metallic sound may be caused by a dry distributor shaft bushing or a dry ignition governor. This trouble can usually be corrected by dropping a small quantity of light oil on the felt pad or wick at the upper end of the distributor shaft directly under the rotor.

Motor Cutting Out on a Pull

Weak Ignition Coil.—A missing or cutting out at sustained high speeds or on a hard pull may be caused by a weak ignition coil or a weak condenser. Both the coil and condenser should be tested and if found to be defective, replaced with new units.

Spark Plug Gaps.—Cutting out on a pull or at high speeds may be caused by a too wide spark plug gap. The spark plug gaps should be adjusted uniformly to not less than .027″ nor more than .032″.

OIL PRESSURE

Model and Year	Min.	Max.
74—1925-26	5 lbs.	30 lbs.
Little Marmon—1927	3 lbs.	40 lbs.
75—1927-28	5 lbs.	30 lbs.
68—1928-29	5 lbs.	40 lbs.
78—1928-29	5 lbs.	40 lbs.
Roosevelt—1929	5 lbs.	40 lbs.
Marmon Roosevelt—1930	5 lbs.	40 lbs.
69—1930	5 lbs.	40 lbs.
Big Eight—1930	5 lbs.	40 lbs.
79—1930	5 lbs.	40 lbs.

IGNITION TIMING

Marmon Model 74 1925.—The contact points should just start to separate when No. 1 piston is at top of the compression stroke with the flywheel mark indicating top dead center 8 flywheel teeth past indicator. The spark lever should be in fully retarded position. (See Ignition Timing Table for contact point gap clearance).

Marmon Model 74 1926, 75 1927-28.—These cars are equipped with distributors having two sets of contact points that should break simultaneously. To time the distributor to the motor, the contact points should just start to separate when No. 1 piston is approaching top dead center of compression stroke and the flywheel mark indicating top dead center is 7 flywheel teeth before the indicator. The spark lever should be in fully advanced position. (See Ignition Timing Table for contact point clearance).

Ignition Timing Table

The following table contains complete timing information for all models of Marmon from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
MARMON						
1925	74	020″-0275″	8 teeth A	Ret.	027″-032″	1-5-3-6-2-4
1926	74	025″-0275″	7 teeth B	Adv.	027″-032″	1-5-3-6-2-4
1927-28	75	025″-027″	7 teeth B	Adv.	027″-032″	1-5-3-6-2-4
1927	L(Little Marmon)	018″-024″	5 teeth B	Adv.	020″	1-6-2-5-8-3-7-4
1928-29	68	022″	2 teeth B	Adv.	025″	1-6-2-5-8-3-7-4
1928	78	022″	5 teeth B	Adv.	025″	1-6-2-5-8-3-7-4
1929	78	022″	2 teeth B	Adv.	025″	1-6-2-5-8-3-7-4
1930	69	022″	2 teeth B	Adv.	025″	1-6-2-5-8-3-7-4
1930	79	022″	2 teeth B	Adv.	028″	1-6-2-5-8-3-7-4
1930	Big Eight	022″	2 teeth B	Adv.	028″	1-6-2-5-8-3-7-4
1929-30	Marmon Roosevelt	022″	2 teeth B	Adv.	025″	1-6-2-5-8-3-7-4

A.—After top dead center. B.—Before top dead center. Adv.—Spark lever fully advanced. Ret —Spark lever fully retarded.

To Synchronize Distributor Points.—The ignition system comprises two ignition coils with a set of breaker arms for each coil. The breaker contacts should separate simultaneously. To synchronize the distributor points, first time one set of points to the motor as described above; next disconnect the primary wire leading to this set of points and adjust the gap clearance of the second set of points so that they just break contact. This can be determined by watching the ammeter on the dash. Another practical method of synchronizing the breaker points is to connect a test lamp in the primary circuit of each set of points and time the points so that both lights light at the same time.

Marmon Model L (Little Marmon) 1927, Model 78 1928.—The contact points should just start to separate when the mark indicating top dead center is five flywheel teeth before the indicator in the peekhole of the flywheel housing with piston No. 1 on compression stroke. The spark lever should be in the fully advanced position (see Ignition Timing Table for contact point clearance). For information on how to synchronize the distributor points, see synchronizing procedure given under the heading To Synchronize Eight Cylinder Distributors With Four Lobe Cams.

Marmon Model 68 1928-29, 78 1929, 69 1930, 79 1930, Big Eight 1930 and Marmon Roosevelt 1929-30.—The contact points should just start to separate when the flywheel mark indicating top dead center is two flywheel teeth before the indicator of the peekhole in the flywheel housing with piston No. 1 on compression stroke. The spark lever should be in the fully advanced position. (See Ignition Timing Table for contact point clearance).

Fig. 1

View of Delco timing tool No. 822570 used to synchronize Delco distributors

Complete information on how to synchronize the distributor points will be found below under the heading To Synchronize Eight Cylinder Distributors With Four Lobe Cam.

To Synchronize Eight Cylinder Distributors With Four Lobe Cams (one ignition coil used).—This distributor has a four lobe cam and two sets of contact points; one set is mounted on a stationary plate and the other set is mounted on a movable plate. The points are arranged to break 45 degrees apart which is equal to 90 degrees of flywheel travel. For contact point clearance, see Ignition Timing Table. Use synchronizing tool No. 822570, Fig. 1, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station. The cam must be removed in order to use this tool and much time can be saved in retiming the distributor to the motor if the position of the rotor is marked before removing the cam.

Turn the rotor against rotation with the fingers to take up backlash in the gears and mark the position of the rotor with a corresponding mark on the side of the distributor housing, then remove the rotor.

Loosen the lock screw in the center of the cam and remove the cam, place the synchronizing tool on the shaft in place of the cam and rotate the tool with the fingers or pliers until the contact rubbing blocks drop into the notches in the side of the tool. Loosen the lock screws which hold the movable plate and adjust the plate by turning the eccentric screw with a screwdriver until both sets of contact rubbing blocks fit evenly against the flat side of the notches in the side of the synchronizing tool.

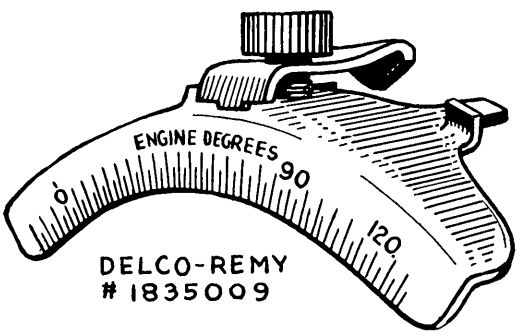


Fig 2

View of Delco timing tool No. 1835009 used to synchronize Delco-Remy distributors

On earlier production which does not have an adjustable plate and eccentric screw, the entire contact point plate which holds both sets of points must be moved until both rubbing blocks fit evenly against the sides of the notches in the tool. When this operation is complete, tighten the lock screw, set the contact points for correct opening and repeat the entire operation for accuracy. Replace the cam and rotor and turn the rotor until the spotting mark is even with the mark on the distributor housing. Remove the rotor and tighten the lock screw in the center of the cam and recheck the rotor scratch marks again making sure that the rotor is held against rotation to take up the slack

To Synchronize Eight Cylinder Distributors With Four Lobe Cams (2 ignition coils used).—This distributor has a four lobe cam and two sets of contact points, one set is mounted on a stationary plate and the other set is mounted on a movable plate. The points are arranged to break 45 degrees apart of distributor shaft rotation which is equal to 90 degrees on the flywheel rim. The correct contact point gap clearance will be found in the Ignition Timing Table. Adjust the contact points to the correct clearance, before synchronizing.

Use synchronizing tool No. 1835009, Fig. 2, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor shaft in the direction of rotation until the contact points on the stationary plate just open. This should be done with a test ammeter or lamp connected in series with the primary ignition lead. With the ignition switch turned on, the ammeter needle will return to zero or the lamp will go out when the points open. Hold the distributor exactly in this position and clamp the synchronizing tool to the side of the distributor with one edge of the rotor point directly even with the zero mark on the tool.

Turn the distributor in the direction of rotation until the same edge of the rotor is even with the 90 degree mark on the scale of the tool. Hold the distributor exactly in this position and adjust the movable plate by loosening the lock screw over the plate and turn the eccentric screw with a screwdriver until the contact points just open.

Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy.

VALVE TIMING

Marmon Model 74 1925-26, 75 1927-28.—To check the valve timing, set the tappet clearance of No. 1 intake valve at .014". The intake valve should just start to open when the flywheel mark indicating top dead center for No. 1 piston is five flywheel teeth past the indicator. Reset the tappets to the correct running clearance after the timing operation has been completed. (See Valve Timing Table for tappet clearances).

Valve Timing Table

The following table contains complete valve timing data for Marmon automobiles from 1925 to 1930 inclusive All tappet setting clearances are for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT For Timing Int	For Timing Exh	Running Int	Running Exh	VALVE TIMING Fly-Wheel Travel	Piston Travel	Int Valve	Exh Valve
MARMON									
1925	74	014″		008″	008″	5 teeth A		Opens	
1926	74	014″		008″	008″	5 teeth A		Opens	
1927-28	75	014″		008″	008″	5 teeth A		Opens	
1927	L (Little Marmon)	010″		008″	008″	1½ teeth B		Opens	
1928-29	68	010″		008″	008″	1½ teeth B	.	Opens	
1928-29	78	010″		008″	008″	1½ teeth B		Opens	
1930	69	010″		008″	008″	1½ teeth B	.	Opens	
1930	79	010″		008″	008″	T C		Opens	
1930	Big Eight	010″		008″	008″	T C.	.	Opens	
1929-30	Marmon Roosevelt	010″		008″	008″	1½ teeth B		Opens	

A —After top dead center B —Before top dead center. T.C—Top dead center.

Marmon Model L 1927, 68 1928-29, 78 1928-29, 69 1930 and Roosevelt 1929-30.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .010″. The intake valve should just start to open when the flywheel mark indicating top dead center for No 1 piston is 1½ flywheel teeth before the indicator of the peekhole in the flywheel housing. After the timing operation is complete, reset the valve tappet to the correct running clearance. (See Valve Timing Table for tappet clearances).

Marmon Model 79 1930, Big Eight 1930.—To check the valve timing set the tappet clearance for No. 1 intake valve at .010″. The intake valve should just start to open when the flywheel mark indicating top dead center of No. 1 piston registers with the indicator mark of the peekhole in the flywheel housing. (See Valve Timing Table for tappet clearances).

TIMING CHAIN ADJUSTMENT

The early models of Marmon had gear driven front end drives. The later models were equipped with a short chain and no manual or automatic adjustment was provided.

GAS LINE SCREENS

All models of Marmon automobiles equipped with vacuum tank fuel feed have two gasoline strainers in the gasoline fuel feed lines. One screen is located in the top of the vacuum tank as shown at (A) in Fig 3 and the other screen is located at the carburetor. To clean the gas line screens in the top of the vacuum tank, remove the connection from the gasoline supply tank and screw out the elbow and bushing together with the gas line screens. Wash in clean gasoline and blow clear with air.

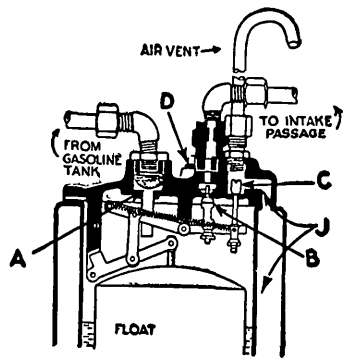


Fig 3

Upper half of vacuum tank showing position of gas line screens To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

All models of Marmon equipped with fuel pump fuel feed have two strainer screens in the gasoline feed line. One set of screens is located in the top of the fuel pump bowl as shown in Fig. 4 and the other screen is located at the carburetor. To clean the gasoline strainer screens in the top of the fuel pump bowl, remove the bowl and wash the screens in clean gasoline. When replacing the strainer screens, make sure that the cork gasket between the top of the bowl and the carburetor body flange is in good condition and does not leak. If the gasket is damaged in any way, replace with a new gasket.

When cleaning the gas line screen at the carburetor, care should be exercised to wash out the carburetor strainer body.

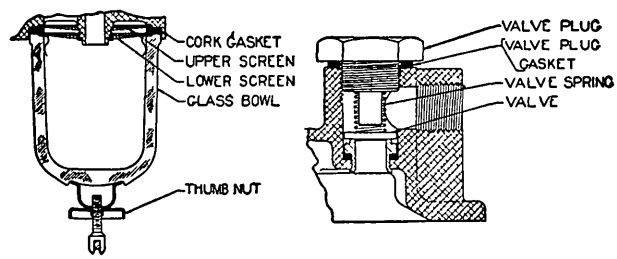


Fig 4

Cross sectional view of fuel pump, glass bowl and pump valve Note the two strainer screens and position of cork gasket at the top of the glass bowl The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVELS

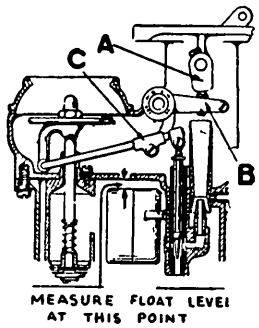
Schebler Carburetors

If a Schebler carburetor is dismantled for any reason, it is very important when reassembling to see that the float is set at the correct level. The float level height can be changed by bending the float lever arm up or down until the desired level is obtained. The float level measurement should be taken at the point between the top of the float and the carburetor body as shown in Fig. 5.

Schebler Model S-1½", Die Cast.—Adjust the float height to from ⅛" to 5/32" measuring between the float and the carburetor body when the float valve is seated.

Fig. 5

Showing point at which float level should be measured on Schebler Model S carburetors The quickest method for checking the float level on Schebler carburetors is to see that the float lever arm stands approximately parallel with the milled flange of the carburetor body



Schebler Model S-1¼", Duplex.—The fuel level in the float bowl will be correct when the distance between the top of the float and the carburetor body is from 25/64" to 27/64" with the float valve seated.

Schebler Model S-1", Stamped Bowl.—The fuel level in the bowl will be correct when the distance from the top of the float to the carburetor body measures from ⅛" to 5/32" with the float valve seated.

Schebler Model S-1", 1¼", 1½", Brass Bowl.—The fuel will stand at the correct level in the carburetor bowl when the distance from the top of the bowl casting to the top of the float measures 5/32" with the float valve seated.

Schebler Model U-1" and 1¼".—With the float assembly in the lower half of the carburetor body hold the body upside down with the float lever resting on the float valve so that it is seated. The distance from the flange of the lower half of the body to the top of the float should measure 2" on the 1" carburetor and 1 15/16" on the 1¼" carburetor. Be sure to remove the bowl gasket before taking this measurement.

On all new Model U Schebler carburetors used on Marmon, set the float level so that the float lever arm is parallel with the flange of the carburetor body when the needle valve is in the closed position.

Stromberg Carburetors

When Stromberg carburetors are shipped from the Chicago factory they are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When higher test (lower specific gravity) 68° to 70° Baumé fuel is used the float level rises and by bending the float arm the gasoline level is brought back to normal.

A table of corresponding float levels for low test and high test fuels will be found on page 70. If trouble is experienced in obtaining a correct float level, refer to this table.

Stromberg Model O-3.—The correct fuel level with the motor not running is 1" measured from the top surface of the float chamber casting to the fuel level. A sight hole is provided in the side of the float bowl; the fuel should stand just even with the bottom of the sight level hole.

To adjust the float level, remove the needle valve cap from the top of the float chamber cover and the float needle stem will be seen. Loosen the lock nut and with a wrench on the flat side of the needle valve, screw the needle down clockwise until it just seats, then back it up two turns off its seat. With this adjustment, the fuel level should be approximately correct. Turning the needle down clockwise lowers the fuel level and turning it up raises the fuel level. After the adjustment operations are completed, tighten the lock nut and replace the cap.

Stromberg Model UX-2.—With the motor stopped, the fuel level should stand 9/16" below the top of the float bowl flange. To readjust the fuel level, bend the float lever arm up to raise the level and down to lower the level. The top of the float should stand approximately 3/64" from the lower surface of the gasket face of the cover with the float needle seated.

CARBURETOR SPECIFICATION DIAGNOSIS

Schebler and Stromberg carburetors have been used as equipment on Marmon automobiles from 1925 to 1930 inclusive. The specification diagnosis information for both makes of carburetors will be found in the following paragraphs under the heading of the carburetor.

SCHEBLER CARBURETORS

Specification Diagnosis

Schebler Model S.—The Schebler Model S carburetor is an air valve carburetor having two air inlets; the fixed air inlet is through the venturi and is very small furnishing barely enough air to enable an engine to idle slowly. Due to the small opening through the venturi, the velocity of the air passing through it is very high even when the engine is idling. This enables it to pick up gasoline at the nozzle and atomize it thoroughly. Due to the design of the venturi, the suction on the gasoline at the nozzle is quite strong making it possible to control the mixture very accurately and to get positive and reliable action at low speeds.

The other air inlet is through the auxiliary air valve, which is closed for idling and wide open for full power. It is very large, making it possible to handle tremendous amounts at the smallest suction. This ability to handle either very large or very small air flows is what is referred to in the term "long range carburetors."

There are three points to be considered in the specification information for Schebler S carburetors; namely, the needle valve assembly, the air valve spring and the cross passage. Complete specification diagnosis information will be found under Schebler Model S in the Schebler section in the back of the book.

Specification Tables.—The following tables include only those parts that are most likely to be at fault when the correct carburetor adjustment cannot be obtained The tables are listed by car model rather than by carburetor model

Marmon 74 1926

(Schebler S 1½" Engine 3¾"x5⅛")

Description of part	Part No or size
Air Valve Spring	*16–48–X
Needle Valve complete	†#10
Accel Pump Cross Passage	‡#52
Accel Pump Cylinder	S–1300–C

*The dimensions of the air valve springs are as follows No of coils, 10, length, 2 3/16" to 2 9/16", wire gauge, 16
†The needle assembly number is indicated by the number of rings machined on the needle body
‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #52 passage is the same size as a #52 wire drill The size of the passage is stamped on the side of the body of the passage

Marmon, Little Marmon, 1927

(Schebler S 1¼" Engine 2¾"x3¾")

Description of part	Part No or size
Air Valve Spring	*16–48–U
Needle Valve complete	†#6
Accel Pump Cross Passage	‡#52
Accel Pump Cylinder	S1722

*The dimensions of the air valve springs are as follows No of coils, 10½ length, 2⅝" to 3⅛", wire gauge, 15
†The needle assembly number is indicated by the number of rings machined on the needle body
‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #52 passage is the same size as a #52 wire drill The size of the passage is stamped on the side of the body of the passage

Marmon 75 1927

(Schebler S 1¼" Engine 3¾"x5⅛")

Description of part	Part No or size
Air Valve Spring	*16–48–X
Needle Valve complete	†#10
Accel Pump Cross Passage	‡#52
Accel Pump Cylinder	S–1300–C

*The dimensions of the air valve springs are as follows No of coils, 10, length, 2 3/16 to 2 9/16" wire gauge, 16
†The needle assembly number is indicated by the number of rings machined on the needle body
‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #52 passage is the same size as a #52 wire drill The size of the passage is stamped on the side of the body of the passage

Marmon 75 1928

(Schebler SX 1½" Engine 3¾"x5⅛")

Description of part	Part No or size
Air Valve Spring	*16–48–X
Needle Valve complete	†#10
Accel Pump Cross Passage	‡#52
Accel Pump Cylinder	S–1300–C

*The dimensions of the air valve springs are as follows No of coils, 10 length 2 3/16" to 2 9/16", wire gauge, 16
†The needle assembly number is indicated by the number of rings machined on the needle body
‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #52 passage is the same size as a #52 wire drill The size of the passage is stamped on the side of the body of the passage

Marmon, Big Eight, 1930

(Schebler SX 1¼" Dup Engine 3¼"x4¾")

Description of part	Part No or size
Air Valve Spring	*16–48–I
Needle Valve complete	†#11
Accel Pump Cross Passage	‡#56
Accel Pump Cylinder	#5

*The dimensions of the air valve springs are as follows No of coils, 8½, length, 2¼" to 2¾", wire gauge, 20
†The needle assembly number is indicated by the number of rings machined on the needle body
‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #56 passage is the same size as a #56 wire drill The size of the passage is stamped on the side of the body of the passage

Specification Diagnosis

Schebler Model U.—The Model U Schebler carburetor is of the air valve type having two air inlets The auxiliary air valve is closed for idling and wide open for full power It is held in the closed position by a spring and will not open until the suction in the body of the carburetor is great enough to compress the spring The spring is just strong enough to insure atomization of the fuel The pressure required to open the valve to its wide open position is very little greater than that required to barely crack it from its seat, thus positive action at low speeds is assured with the greatest possible accuracy at high speeds

The fixed air opening is through the venturi past the nozzle The air for the venturi passes through the same opening at the intake to the carburetor as the air which goes past the air valve As it passes the nozzle, it picks up the proper amount of fuel and atomizes it, delivering it to the motor As the air valve opens, the air passing this valve mixes with the mixture delivered from the venturi The fixed air opening through the venturi has two important parts to play When the air valve is clamped down in the starting position and the needle valve raised to the starting position, a very rich mixture is delivered out of the venturi which produces a good starting condition When the carburetor is operating normally, the fixed air opening through the venturi creates a high air velocity past the nozzle and the fuel delivered out of the nozzle is torn up and atomized so that good low speed operation is obtained

Complete carburetor specification diagnosis information for Schebler Model U carburetors will be found under the heading Schebler Model U in the Schebler section in the back of this book

STROMBERG CARBURETORS

Two models of Stromberg carburetors have been used on Marmon from 1925 to 1930 inclusive In 1925 Stromberg Model O Series were used From 1928 to 1930 Stromberg Series U carburetors were used These carburetors are of the plain tube type and the late Model U jobs have the vacuum economizer.

Complete carburetor specification information will be found in the Stromberg section in the back of this book

Specification Tables.—The following specification tables contain the carburetor specifications for each model of Marmon using Stromberg carburetors.

Marmon, Roosevelt, 1929-30

(Stromberg UX-2 Engine 2¾"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#70
Main Metering Jet	.....	.....
High Speed Needle Valve		Adjustable
By-Pass Jet	.031"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#54
Pump Reducer	.....	#70
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/32"	.....

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #70 wire drill size.

Marmon 34D 1925

(Stromberg O-3 Engine 3¾"x5⅛")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	#56–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 13/32")	.....	#56
Main Discharge Jet	.....	‡#A–28, #B–15
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#28–#35
Accelerating Well Discharge Jet	.....	#54
Venturi	1¼"	.....

*The idle jet above the throttle is a #71 wire drill size; the jet below the throttle is a #56 wire drill size.
†This is a double end bleeder having one end #28 wire drill size and other end #35 wire drill size.
‡First bore of main discharge jet is #28 wire drill; second bore #15 wire drill.

Marmon 68 1927-28-29

(Stromberg UX-2 Engine 2¾"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#54–#64
Main Metering Jet	.....	.....
High Speed Needle Valve		Adjustable
By-Pass Jet	.031"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#54
Pump Reducer	.....	#70
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/32"	.....

*The idle jet below the throttle is #54 wire drill size; the jet above the throttle is #64 wire drill size.

Marmon 78 1927-28-29

(Stromberg UX-2 Engine 2 15/16"x4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#68
Main Metering Jet	.....	.....
High Speed Needle Valve (open No. notches)		Adjustable
By-Pass Jet	.031"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#65
Pump Reducer	.....	#72
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/32"	.....

*The idle jet below the throttle is #56 wire drill size; the jet above the throttle is #68 wire drill size.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
MARMON					SCHEBLER
1926	74	Own	6	3¾"x5⅛"	S-1½"
1927	Little Marmon	Own	8	2¾"x3¾"	S-1¼"
1927	75	Own	6	3¾"x5⅛"	S-1½"
1928	75	Own	6	3¾"x5⅛"	SX-1½"
1929	79	Own	8	3 1/16"x4¾"	U-1½"
1930	Big Eight	Own	8	3¼"x4¾"	U-1¼"
1930	79	Own	8	3 1/16"x4¾"	TX7-1¼"
					STROMBERG
1925	74	Own	6	3¾"x5⅛"	O-3
1928	68	Own	8	2¾"x4¼"	UX-2
1928	78	Own	8	2 15/16"x4 "	UX-2
1929	68	Own	8	2 15/16"x4¼"	UX-2
1929	78	Own	8	2 15/16"x4 "	UX-2
1929	Roosevelt	Own	8	2¾"x4¼"	UX-2
1930	Marmon Roosevelt	Own	8	2¾"x4¼"	UX-2
1930	69	Own	8	2 15/16"x4¼"	UX-2

ADJUSTMENT PRECAUTIONS

It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making a range adjustment on Schebler Model U carburetors. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjusting operation.

The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. This is especially true of idle and range adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the points where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Affect of Leaky Bowl on Adjustment.—On all Model U Schebler carburetors a correct adjustment cannot be obtained unless the gasoline bowl is absolutely tight against the body flange. If the bowl has been removed for any reason, a new bowl gasket should be used and checked for leaks.

Auxiliary Needle Valve Held Open (Stromberg U Carburetors).—On cars equipped with Stromberg Model U carburetors, low gasoline mileage may be caused by the auxiliary control

lever cam riding the auxiliary control lever thus holding the auxiliary needle valve open.

To correct, set the auxiliary control lever cam so that there is approximately 1/16" clearance between the cam and the auxiliary control lever.

Idle Adjustment (Stromberg Carburetors).—If difficulty is experienced in obtaining a correct idle adjustment on Stromberg carburetors, check to see that the idling opening in the throat of the carburetor both above and below the throttle are not plugged up. If these jets are plugged up, the carburetor should be removed from the manifold, thoroughly washed in clean gasoline and blown dry with air.

SCHEBLER CARBURETORS

Two types of Schebler carburetors have been used as equipment on Marmon automobiles from 1926 to 1930 inclusive. From 1926 to 1928 Model S carburetors were used. In 1930 Model U carburetors were used.

Carburetor Adjustment

Schebler Model S.—Complete adjustment information for all models of Schebler S carburetors will be found in the Schebler section in the back of this book, under the heading Schebler Model S.

Schebler Model U.—Complete adjustment information for Schebler Model U carburetors will be found in the Schebler section in the back of this book.

STROMBERG CARBURETORS

Complete adjustment information for all models of Stromberg carburetors used on Marmon automobiles will be found in the Stromberg section in the back of this book under the heading of the carburetor model.

Nash 1925-1930

Motor Tune-Up

The most important points to watch when tuning Nash engines are the ignition timing, distributor and spark plug point settings and on cars equipped with twin ignition, extreme care should be exercised to see that the distributors are properly synchronized.

While the carburetors used on Nash automobiles are of simple construction, it is very important that the heat manifold control be properly adjusted in order to obtain maximum motor efficiency.

Observe closely all special information following the motor tune-up operations.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
   Note: Inspect automatic spark advance for broken or sticking springs.
2. Synchronize distributor points.
3. Check ignition timing; adjust if necessary.
   Note: Inspect manual spark advance and see that it has its full range of movement.
4. Adjust the valve tappets and free up valves.
5. Clean gas line strainers and screens; also check gas line for loose fittings.
6. Check heat control valve.
7. Check throttle valve for opening.
8. Check choke valve for position.
9. Check manifold gasket; see that all manifold flange nuts are tight.
10. Check high tension wiring.
11. Adjust carburetor.
12. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Broken Governor Spring.—A poor idling condition may be caused by broken or sticking governor springs. When this trouble occurs, the motor will run rough at idling speed and motor performance will be affected at all speeds. To correct this condition of trouble, replace or free up the governor spring.

Spark Plug Gap Setting.—On cars equipped with twin ignition, care should be exercised to see that the spark plug gaps do not exceed .025". If the spark plug gaps exceed this setting, a poor idling condition may result.

Dirty Idling Jets (Carter Carburetors).—On Nash cars equipped with Carter carburetors a poor idling condition may be caused by dirt in the idle jets. When this trouble is encountered, remove the carburetor from the car and clean all jets and passageways thoroughly. The carburetor should be washed in clean gasoline and blown dry with air.

Poor Acceleration

Broken Governor Springs.—A condition of poor acceleration may be caused by broken or sticking governor springs. To correct this trouble, either free up the old springs or replace with new springs.

Carburetor Adjustment (Carter Carburetors).—On Nash cars equipped with Carter carburetors, acceleration may be improved by adjusting the idling screw slightly rich. A slightly rich idle adjustment may affect the motor operation slightly at idle speeds on the service floor but will generally give better acceleration and smooth operation on the road.

Lack of Power

Hole in Intake Heat Manifold Riser.—Failure of the motor to accelerate properly may be caused by a hole burned in the intake heat manifold riser. The symptoms of this trouble are generally a lack of power, poor acceleration and trouble in obtaining a correct carburetor adjustment. To correct the trouble, replace the intake manifold riser.

Heat Control Lever (Marvel Carburetors).—The heat manifold on Nash cars equipped with Marvel carburetors are for the purpose of assisting in obtaining maximum efficiency from the fuel used.

Poor acceleration and lack of power will inevitably result if the heat control levers are not properly adjusted for driving conditions.

If the car owner complains of poor motor performance and lack of power, check to see that the heat manifold control levers are properly adjusted.

Ignition Coils (Twin Ignition).—On Nash cars equipped with twin ignition, poor acceleration and motor performance may be caused by one of the two ignition coils being weak. If this trouble is encountered, replace weak coil with a new one.

Broken Valve Springs.—A lack of power may be caused by broken valve springs. When this trouble is encountered, replace the broken springs with new ones. A broken valve spring may also make a correct carburetor adjustment difficult.

Low Gasoline Mileage

Maximum gasoline mileage can only be obtained when all motor adjustments have been accurately and correctly made. This is especially true of the ignition timing and spark plug point settings since it is possible for the ignition timing to be out enough to affect the gasoline mileage and not seriously affect the motor performance at moderate car speeds.

Whenever a condition of low gasoline mileage is encountered, check to see that all motor adjustments are correctly and properly made.

Leaky Fuel Pump Diaphragm.—On cars equipped with fuel pumps, low gasoline mileage may be caused by a leaky or porous pump diaphragm. This trouble can be easily checked out by watching the motor on the service floor and if there is a leak in the diaphragm the gasoline can be seen as it passes through the hole in the side of the pump body just beneath the diaphragm.

In most cases where the pump diaphragm has leaked for any length of time, a white spot will be noticed on the sod or engine pan beneath the fuel pump.

Motor Cutting Out on Pull

Vacuum Tank Failure.—On Nash cars equipped with vacuum tank fuel feed, cutting out on a pull may be caused by a failure of the gasoline tank to supply fuel to the carburetor. When this trouble is encountered; it may be corrected by either installing a vacuum booster or by increasing the size of the suction metering hole.

OIL PRESSURE

Model and Year	Min.	Max.
Special 6 (131)—1925	20 lbs.	to 35 lbs. at 30 M.P.H.
Advanced 6 (161)—1925	30 lbs.	to 40 lbs. at 30 M.P.H.
Light Six—1926-27	15 lbs.	to 25 lbs. at 30 M.P.H.
Spec. 6—1926-27-28-29	30 lbs.	to 40 lbs. at 30 M.P.H.
Adv. 6—1926-27-28-29	30 lbs.	to 40 lbs. at 30 M.P.H.
Standard Six—1928	20 lbs.	to 35 lbs. at 30 M.P.H.
St'd'rd Six (400)—1929	20 lbs.	to 35 lbs. at 30 M.P.H.
Single Six—1930	20 lbs.	to 35 lbs. at 30 M.P.H.
Twin Ignition 6—1930	30 lbs.	to 40 lbs. at 30 M.P.H.
Twin Ignition 8—1930	20 lbs.	to 35 lbs. at 30 M.P.H.

IGNITION TIMING

Nash Special and Advanced Six 1925-26-27-28, Light Six 1927-28.—The contact points should just start to separate when No. 1 piston is at top dead center of the compression stroke, spark control lever in full retard position (see Ignition Timing Table for contact point clearances).

Nash Standard Six (400 Series) 1928-29, Single Ignition Six 1930.—Contact points should just start to separate when No. 1 piston is ½" (flywheel travel) before top dead center of the compression stroke. The distributor is of the full automatic type and after the timing operation has been completed, the car should be road tested and the timing altered to the position of best performance. (See Ignition Timing Table for contact point clearances).

Nash Special and Advanced Six (400 Series) 1928-29, Twin Ignition Six 1930, Twin Ignition Eight 1930.—Time the ignition so that both sets of contact points just start to separate, when the ignition marks, IGN, on the balancer at the front of the crankshaft is in line with the pointer on the timing gear case and No. 1 piston is at top of compression stroke. The manual spark control should be in full advanced position. (For contact point clearance, see Ignition Timing Table).

Ignition Timing Table

The following table contains ignition timing data for all models of Nash automobiles from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
NASH						
1925	Special 6 (131)	.020″	T.C.	Ret.	.025″-.030″	1-5-3-6-2-4
1925	Advanced 6 (161)	.020″-.025″	T.C.	Ret.	.025″-.030″	1-5-3-6-2-4
1926-27	Light 6	.020″	T.C.	Ret.	.025″	1-5-3-6-2-4
1926-27-28	Special 6	.020″	T.C.	Ret.	.025″-.030″	1-5-3-6-2-4
1926-27-28	Advanced 6	.020″	T.C.	Ret.	.025″-.030″	1-5-3-6-2-4
1928-29	Special 6 (400)	.018″-.020″	*IGN	Adv.	.023″-.025″	1-5-3-6-2-4
1928-29	Advanced 6 (400)	.018″-.020″	*IGN	Adv.	.023″-.025″	1-5-3-6-2-4
1928	Standard 6	.020″	T.C.	.....	.025″-.030″	1-5-3-6-2-4
1928-29	Standard 6 (400)	.020″	½″ B	.....	.025″-.030″	1-5-3-6-2-4
1930	Single Ign. 6	.020″	½″ B	.....	.025″	1-5-3-6-2-4
1930	Twin Ign. 6	.020″-.024″	*IGN	Adv.	.020″-.025″	1-5-3-6-2-4
1930	Twin Ign. 8	.020″-.024″	*IGN	Adv.	.020″-.025″	1-6-2-5-8-3-7-4

Adv.—Spark lever fully advanced. B.—Before top dead center.
Ret.—Spark lever fully retarded. T.C.—Top dead center.
* A timing mark (I.G.N.) is provided on the balancer at the front end of the crankshaft for timing the ignition.

How to Synchronize Twin Ignition Distributors.—The ignition system comprises two complete circuits each independent of the other with the exception that both sets of contact points are mounted in one distributor.

Adjust both sets of points to the correct contact point clearance as given in the Ignition Timing Table and time so that both sets of points break contact simultaneously. This adjustment can be made in the following way. One set of distributor points is mounted in a fixed position on the breaker plate base of the distributor and the other set is mounted on a movable base. By the aid of a test lamp connected across both sets of breaker points, adjust the movable set of points until they break contact at the same time that the stationary set of points separate. The distributor should be timed to the motor by the stationary set of contact points.

VALVE TIMING

Nash Special Six 1925-26, Advanced Six 1925-26, Twin Ignition Six 1930.—Set the exhaust valve tappet for No. 1 cylinder to the correct clearance for timing as given in the Ignition Timing Table. The exhaust valve should just close when the flywheel mark indicating top dead center for No. 1 piston is three fourths of a flywheel tooth past the indicator in the peekhole in the flywheel housing. After the timing operation is complete recheck the valve tappet clearance to the correct running clearance as given in the Ignition Timing Table.

Nash Light Six 1926-27, Standard Six 1928-29, and Single Six 1930.—Set the tappet clearance

Valve Timing Table

The following table contains complete valve timing data for all Nash automobiles from 1925 to 1930 inclusive. Valve tappet clearances are given for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int Valve	Exh Valve
		Int	Exh	Int	Exh			
1925	Special 6 (131)		015″	010″	012″	¾″ A		Closes
1925	Advanced 6 (161)		015″	010″	012″	¾″ A		Closes
1926-27	Light 6		008″	006″	008″	T C		Closes
1926-27-28-29	Special 6		015″	010″	012″	¾″ A		Closes
1926-27-28-29	Advanced 6		015″	010″	012″	¾″ A		C oses
1928	Standard 6		008″	006″	008″	T C		Closes
1929	Standard 6 (400)		008″	006″	006″	T C		Closes
1930	Single 6		008″	008″	008″	T C.		Closes
1930	Twin Ignition 6		015″	012″	012″	¾″ A		Closes
1930	Twin Ignition 8		015″	012″	012″	½″ A		Closes

A —After top dead center T C —Top dead center

for No. 1 exhaust valve at .008″. The exhaust valve should just close when the flywheel mark indicating top dead center for No. 1 piston is at the indicator in the peekhole in the flywheel housing. Valve tappet clearances will be found in the Ignition Timing Table.

Nash Twin Ignition Eight 1930.—Set the valve tappet clearance for No. 1 exhaust valve at .015″. The exhaust valve should just close when the flywheel mark indicating top dead center for No. 1 piston is one half flywheel tooth past the indicator in the peekhole in the flywheel housing. After the timing operation is complete, reset the valve tappets to the correct running clearance. Valve tappet clearances will be found in the Valve Timing Table.

GAS LINE SCREENS

All Models of Nash equipped with vacuum tank fuel feed have two strainer screens in the gasoline system from the fuel tank to the carburetor. One screen is located in the vacuum tank and the other is located at the carburetor.

All Models of Nash equipped with fuel pump fuel feed have two gasoline strainer screens in the gasoline system from the fuel tank to the carburetor. One strainer screen is located in the top of the fuel pump bowl and the other is located at the carburetor.

When cleaning the gas line screen in the top of the fuel pump bowl, care should be exercised to see that the gasket at the top of the glass bowl does not leak when the bowl is reassembled into position.

Carburetor Specifications

FLOAT LEVELS

Carter and Marvel carburetors have been used on Nash automobiles from 1925 to 1930 inclusive. The float level adjustment information for both makes of carburetors will be found in the following paragraphs under the heading of the carburetor.

Carter Carburetors

Carter DRO-75S (Nash Light Six 1926).—The fuel will stand at the correct level in the float bowl when the distance from the top of the float to the machined surface of the float bowl casting is ½″ with the needle valve closed. (See Fig. 1). To take the float measurement, hold the bowl assembly in an inverted position and measure on the side opposite the gasoline float valve. To adjust the float level, bend the float lever lip which comes in contact with the float needle up, to lower the level, and down to raise the level.

Carter DRHO-82S (Nash Light Six 1927).—The fuel will stand at the correct level in the float bowl when the distance from the top of the float to the machined surface of the float bowl casting measures 9/16″ with the intake needle valve closed. (See Fig 1). This measurement should be taken on the side of the float opposite the gasoline intake neeedle. To adjust the float level, bend the float lever lip that comes in contact with the float needle valve up to the lower level and down to raise the level.

Carter DRJHO8-123S (Nash Standard Six 1928).—The fuel will stand at the correct level in the float bowl when the top of the float stands ⅝″ from the machined surface of the float bowl casting when the intake needle valve is closed. (See Fig. 1). This measurement should be taken on the side of the float opposite the needle valve. To adjust the float level, bend the float lever arm up to lower the level and down to raise the level.

Carter RTO8-134S (Nash Standard Six 400 1929).—The fuel will stand at the correct level in the float bowl when the top of the float is 21/32″ from the machined surface of the float bowl casting with the intake needle valve in the closed

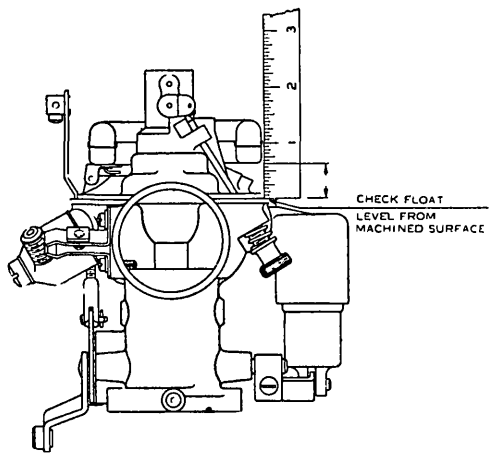


Fig. 1

View of Marvel carburetor used on Nash showing the carburetor with the bowl removed and held in the inverted position for measuring the float level height. This measurement should be taken on the side of the float opposite the float needle valve and the distance should be measured from the machined surface of the body to the top of the float as shown.

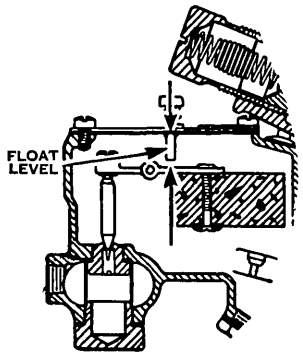


Fig. 2

Cross sectional view of Marvel float bowl assembly used on Nash. The float level should be measured at a point directly under Air Adjustment screw. Adjustment should be taken with float valve closed and float in raised position.

position (see Fig. 1). To measure the float height, hold the bowl assembly in the inverted position. To adjust the float level, bend the float lever lip up to lower the level and down to raise the level.

Carter RTO8-147S (Nash Single Six 1930).—The fuel will stand at the correct level in the float bowl when the top of the float is 11/16" from the machined surface of the float bowl casting with the float needle in the closed position. (See Fig. 1). To adjust the float level, bend the float lever lip up to lower the level and down to raise the level.

Marvel Carburetors

Marvel All Models Used on Nash Automobiles From 1925 to 1930 Inclusive.—The fuel level will stand at the correct height in the float bowl when the float rests in a perfectly horizontal position with the float needle valve closed. (See Fig. 2).

CARBURETOR SPECIFICATION DIAGNOSIS

Two makes of carburetors have been used on Nash automobiles from 1925 to 1930 inclusive; namely, Carter and Marvel. Carburetor specification information will be found in the following paragraphs under the carburetor heading.

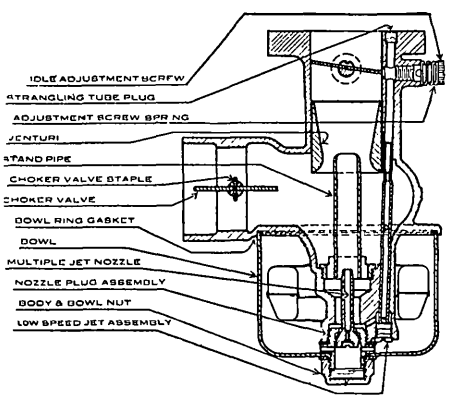


Fig. 3

Cross sectional view of Carter DRO carburetor showing the multiple jet nozzle and idling system. The idling screw controls the amount of air admitted to the idling mixture.

CARTER CARBURETORS

Nash Light Six 1926 (Carter Model DRO-75S).—The Model DRO Carter carburetor is a multiple jet plain tube carburetor with adjustments for both high and low speeds. Maximum economy is obtained at approximately 20 miles per hour and minimum at wide open throttle.

The low speed jet assembly supplies gasoline to the motor at idle engine speed and up to approximately 15 miles per hour, gasoline flowing through a drilled passage connecting the low speed jet chamber with the carburetor well. (See Fig. 3). At idle, gasoline is drawn through the low speed jet and idling port at the edge of the throttle valve. The idle adjustment screw regulates the amount of air entering this port. Backing out adjusting screw admits more air and consequently makes idling mixture leaner.

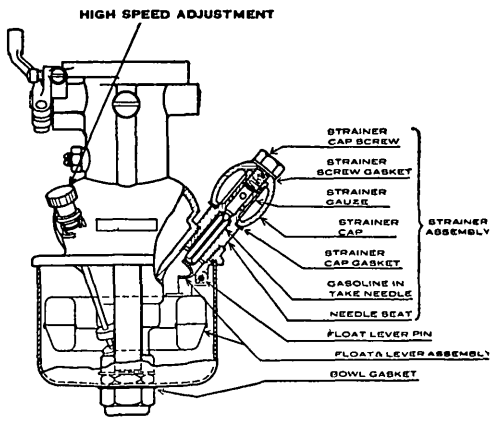


Fig. 4

Sectional view of Carter Model DRO carburetor showing the high speed adjusting screw. The high speed adjusting needle controls the amount of gasoline supplied to the carburetor well.

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber. The high speed adjusting needle supplies gasoline to the carburetor well. (See Fig. 4). From this well a combination of gasoline and air is drawn into the nozzle chamber through accelerating jets on the side of the nozzle intermingling with fuel from the vertical jet. The combination forming a fine spray which is carried by the standpipe to the venturi or main air passage where it is absorbed by incoming air forming the mixture on which the engine operates. Jets on the side of the nozzle come into operation in direct proportion to the throttle position. The further the throttle is opened, the more jets are in operation. At wide open throttle, all jets are working and the engine is getting the maximum supply of fuel possible.

Carburetor Specifications

The following table contains the complete carburetor specifications for Carter Model DRO used on Nash Light Six 1926. To read, hold carburetor air intake from you.

Make of Engine: Nash. No. cylinders: 6. Four cycle.

Carburetor Model: DR-O. Size, 1 inch. Finish: Duco or equivalent—Bright dipped bowl.

Size Main Venturi: 25/32 inch. Upper well depth from standpipe seat: ¼ inch.

Lower Well Diameter: 13/32 inch. Standpipe: Round nose top. 5/16 inch I.D.; four No. 30 air holes.

Low Speed Jet: No. 67 drill. By-pass: No. 47 drill.

Economizer: No. 56 drill.

Float Level: Top of float to be ½ inch from casting shelf.

Idle Port Opening Above Valve with Valve Tight Closed: .058 inch to .062 inch.

Idle Port Length: .156 inch. Width: .040 inch.

Type of Idle: Air bleed.

Nozzle: Diagonal jet: None. Vertical jet: No. 70 drill. Top jet: No. 38 drill.

ACCELERATING JETS:	Number	Drill Size	Distance from Top of Tube
(Combination No. 35).....	1	44	¼ inch
	1	65	½ inch
	1	38	13/16 inch

High Speed Needle Seat: No. 56 drill.

Throttle Lever: Location: Left side. Type: Cast brass.

Length of Lever: 1¼ inch. In center of travel: Lever points up and towards you. To close throttle, move lever from you.

Choker: Location of valve: In carburetor air intake. Type: Butterfly. Choker lever on left side. In open position points toward you. To close choker, move lever up.

Tube Support Lever: Stamped Steel. Tube clamp nut on inside.

Gasoline Intake Needle: Standard. Needle seat: Standard.

Gasoline Line: Size: ¼ inch. Type of connection: S.A.E.

Strainer Cap: Straight, points toward air intake.

Remarks: Recommended setting for idle adjustment screw: Three-quarter to one and one quarter turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded. Recommended setting for high speed needle: One and one-quarter to one and one-half turns open.

Nash Light Six 1927 (Carter Model DRHO).—The Model DRHO Carter carburetor is a multiple jet plain tube carburetor with adjustments for both high and low speeds. Maximum economy is obtained at approximately 20 miles per hour and minimum at wide open throttle.

The low speed jet assembly supplies gasoline to the motor at idling engine speed and up to approximately 15 miles per hour, gasoline flowing through a drilled passage connecting the low speed jet chamber with the carburetor well. (See Fig. 5). At idle, gasoline is drawn through the low speed jet and idling port at the edge of the throttle. The idle adjustment screw regulates the amount of air entering this port. Backing out the adjustment admits more air and consequently makes the idling mixture leaner.

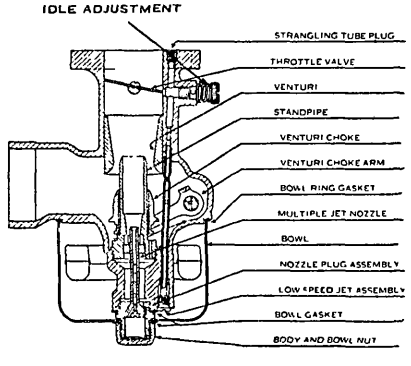


Fig. 5

Cross sectional view of Carter DRHO carburetor showing multiple jet assembly, cone choke and idling system. The idling screw controls the amount of air admitted to the idling mixture.

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber. High speed adjusting needle supplies gasoline to the carburetor well. From this well, a combination of gasoline and air is drawn into the nozzle chamber through the accelerating jets on the side of the nozzle intermingling with fuel from the vertical jets, the combination forming a fine spray which is carried by the standpipe to the venturi, on main air passage where it is absorbed by the incoming air forming a mixture on which the engine operates. The jets on the side of the nozzle come into operation in direct proportion to the throttle position. The further the throttle is opened, the more jets are in operation. At wide open throttle, all jets are working and the engine is getting the maximum supply of fuel possible.

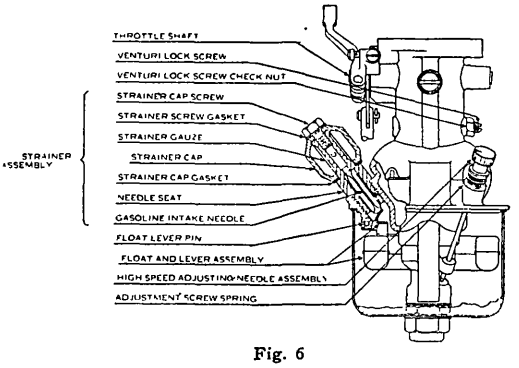


Fig. 6

Sectional view of Carter Model DRHO carburetor showing high speed adjustment screw. The high speed adjusting needle controls the amount of gasoline supplied to the carburetor well.

A special venturi choking device is used on these carburetors as shown in Fig. 5. The starting mixture has been carefully calibrated and when the motor is cranked over the correct proportion of air commingles with a spray of fuel forming a perfect starting mixture. Choking of the motor is brought about by sliding the venturi cone up into the venturi throat, thus cutting down the supply of air which results in a richer mixture for starting.

While warming up the motor, set the choke to a position where the motor runs best, pushing it in to regular running position when the motor is fairly warmed up.

Carburetor Specifications

The following table contains complete carburetor specifications for Carter Model DRHO as used on Nash Light Six 1927. To read, hold carburetor air intake from you.

Make of Engine: Nash. No. cylinders: 6. Four cycle.

Carburetor Model: DRHO. Size 1 inch. Finish: Duco or equivalent—Bright dipped bowl.

Size Main Venturi: 27/32 inch. Upper well depth from standpipe seat: ¼ inch.

Lower Well Diameter: 13/32 inch. Stand pipe: Round nose top 7/16 I.D. with 5/16 inch venturi: one No. 51 air hole. Two air slots .189 to .192 high by .233 to .236 wide.

Low Speed Jet: No. 70 drill. By-pass: No. 53 drill. Economizer: No. 56 drill.

Float Level: Top of float to be 9/16 inch from machined surface of casting.

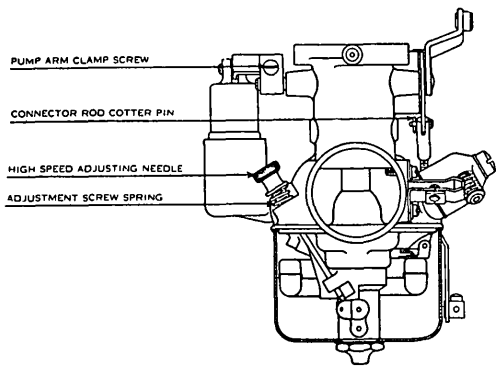


Fig. 7

Sectional view of Carter Model DRJHO8 carburetor showing the high speed adjusting needle and accelerating pump. The high speed adjusting needle controls the amount of gasoline supplied to the carburetor well.

Idle Port Opening Above Valve with Valve Tight Closed: .026 inch to .030 inch.

Idle Port Length: .130 inch. Width· .040 inch.

Type of Idle: Air bleed.

Nozzle: Diagonnal jet: None. Vertical jet No. 70 drill. Top jet: No. 32 drill. Length 1 13/16 overall.

ACCELERATING JETS:	Number	Drill Size	Distance from Top of Tube
(Combination No. 43)	1	60	¾ inch
	1	60	15/16 inch
	1	44	1⅛ inch
	1	34	1⅜ inch

High Speed Needle Seat: No. 58 drill.

Throttle Lever: Location: Left side. Type. Cast brass.

Length of Lever: 1¼ inch. In center of travel. Lever points up and towards you. To close throttle, move lever from you.

Choker: Location: In venturi. Type Cone. Choker lever on left side. In open position points down. To close choker, move lever from you.

Tube Support Bracket: Stamped Steel; on air intake.

Gasoline Intake Needle: Standard. Needle seat. Standard.

Gasoline Line: Size: ¼ inch. Type of connection: S.A.E.

Strainer Cap: Straight, points toward air intake.

Remarks: Recommended setting for idle adjustment screw: One-half to one and one-half turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded. Recommended setting for high speed needle: One to one and one-half turns open

Nash 400 Series 1928 (Carter Model DRJHO8). —On this carburetor an accelerating pump has been added to the regular carburetor accelerating well. This pump supplies additional fuel for acceleration. The gasoline is drawn from the bowl chamber and discharged into the venturi when the throttle is opened. (See Fig. 7).

A fuel metering rod attached to the throttle valve passes through the venturi jet and regulates the amount of fuel supplied by this jet according to the position of the throttle. (See Fig. 8). This permits the carburetor to give greatest possible mileage at part throttle position, or at speeds at which the car is normally driven and to deliver maximum power when the throttle is wide open by automatically supplying a richer mixture at wide open throttle position

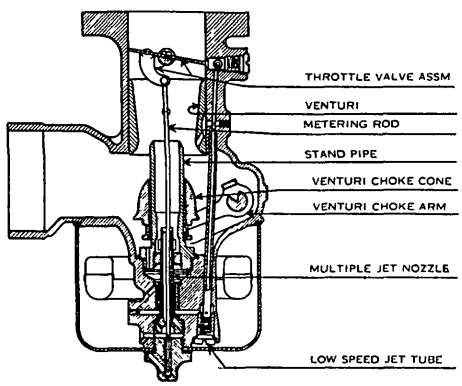


Fig. 8

Cross sectional view of Carter Model DRJHO8 showing the multiple jet nozzle, choke cone, metering rod and idling system. Gasoline for idling speed is drawn from the carburetor well through the medium of the idling tube.

There are but two single adjustments, one for the idle speed which regulates the supply of fuel up to approximately 18 miles per hour (Fig. 9) and the high speed adjustment which functions from 18 miles an hour to top speed. (See Fig. 7).

Carburetor Specifications

Complete carburetor specifications for Carter Model DRJHO8 used on Nash automobiles will

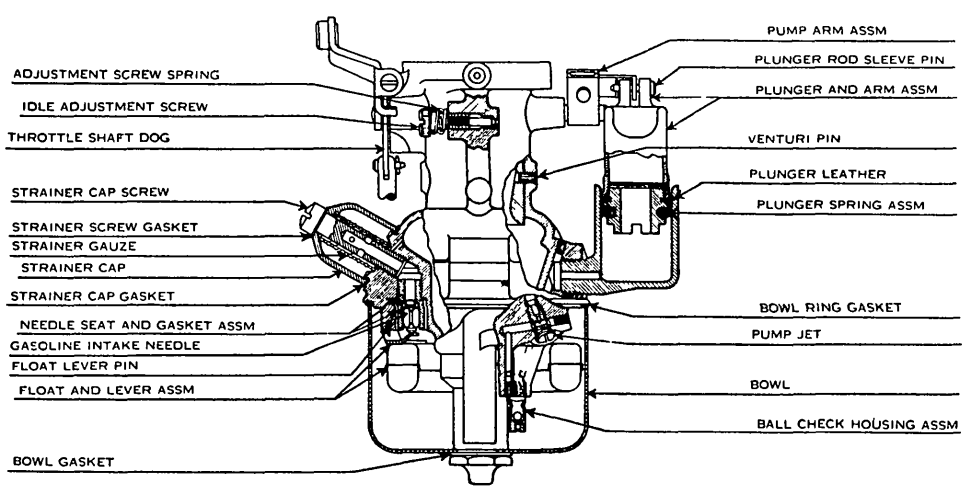


Fig. 9

Cross sectional view of Carter carburetor Model DRJHO8 showing the idling adjusting screw and the accelerating pump. The idle adjustment works on air so that screwing it out leans the mixture and screwing it in richens the mixture.

be found in the table below. To read, hold carburetor air intake from you.

Make of Engine: Nash. No. cylinders: 6. Four cycle.

Carburetor Model: DRJHO-8. Size 1 inch. Body finish: Duco or equivalent.

Size of Main Venturi: 15/16 inch with No. 40 by-pass through venturi. By-pass through casting No. 44 drill. Upper well depth from standpipe seat ¼ inch. Lower well, bushed to 15/64 inch diameter.

Standpipe: Round nose top 7/16 I. D. with 5/16 inch venturi. One No. 51 air hole in base. Two air slots .189 inch high by .311 to .314 inch wide.

Low Speed Jet: No. 72 drill. By-pass: No. 70 drill. Economizer: None.

Float Level: Top of float to be ⅝ inch from machined surface of casting.

Accelerating Pump: Type: Delayed action. Stroke: 19/32 inch, approximate. Discharge jet size: No. 75 drill. Feed to ball check size: No. 50 drill.

Inside Vent: No. 60 drill. Outside vent: None.

Idle Port Opening Above Valve with Valve Tight Closed: .043 inch to .047 inch.

Idle Port: Length: .156 inch. Width: .040 inch.

Type of Idle: Air bleed.

Nozzle: Diagonal jet: None. Vertical: No. 48 drill. Top jet: No. 26 drill.

ACCELERATING JETS:	Number	Drill Size	Distance from Top of Tube
(Combination No. 63)	4	57	¾ inch
	4	69	1 5/32 inch
	4	69	1⅜ inch

Feed to Vertical Jet: No. 50 drill.

Metering Rod: Diameter: Top .070. Bottom .060. Length 4¾ inch.

High Speed Needle Seat: No. 54 drill.

Throttle Lever: Location: Left side. Type: Stamped steel. Length of lever: 1¼ inch. In center of travel lever points up. To close throttle move lever from you.

Choker: Location: In venturi. Type: Cone. Choker lever on left side. In open position points down. To close choker move lever from you.

Tube Support Bracket: Stamped steel. On air intake.

Gasoline Intake Needle: Square vertical. Needle Seat: Standard vertical.

Gasoline Line: Size: ¼ inch. Type of connection: S.A.E.

Strainer Cap: Angled: Points away from you and down.

Remarks: Recommended setting for idle adjustment screw: Three-quarters to one and one-quarter turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded. Recommended setting for high speed needle: One and one-quarter to one and three-quarter turns open.

Nash Standard Six 1929 (Carter Model RTO8).—This carburetor is similar to the DRJHO8 carburetor described above with the exception that the accelerating pump is larger and the carburetor is equipped with but one adjustment. Another change which should be noted is the pump piston actuating arm which has two holes drilled in it; one for summer driving and the other for winter driving.

Carburetor Specifications

The following paragraphs contain complete carburetor specification information for Carter Model RTO8 used on Nash Standard Six 1929. To read, hold carburetor air intake from you.

Make of Engine: Nash. No. cylinders: 6. Four cycle.

Carburetor Model: RTO8. Size 1⅛ inch. Body finish: Duco or equivalent. Brass bowl.

Size of Main Venturi: 15/16 inch. Upper well depth from standpipe seat ¼ inch. Lower well, diameter 11/32 inch.

Standpipe: Round nose top 7/16 I.D. with 5/16 inch venturi. One No. 49 air hole in base. Two air slots .189 to .192 inch high by .311 to .314 inch wide.

Low Speed Jet: No. 70 drill. By-pass: No. 70 drill. Economizer: None.

Float Level: Top of float to be 21/32 inch from machined surface of casting, opposite needle seat.

Accelerating Pump: Type: Delayed action. Stroke: Summer setting 3/16 inch. Winter setting ⅜ inch. Discharge jet size: No. 70 drill. Feed to ball check size: No. 40 drill.

Inside Vent: No. 50 drill. Outside vent: None.

Idle Port Opening Above Valve with Valve Tight Closed: .026 inch to .030 inch.

Idle Port: Length .176 inch. Width: .040 inch.

Type of Idle: Air Bleed.

Main Well Jet: Size: No. 55 drill. Auxiliary Jet: None.

Nozzle: Diagonal jet: None. Vertical: No. 48 drill. Top jet: No. 26 drill.

ACCELERATING JETS:	Number	Drill Size	Distance from Top of Tube
(Combination No. 68)	1	70	5/16 inch
	4	57	¾ inch
	4	69	1 5/32 inch
	4	69	1⅜ inch

Feed to Vertical Jet: No. 44 drill.

Metering Rod: Diameter: Top .070. Bottom .056. Length 4 57/64 inch.

Throttle Lever: Location: Left side. Type: Stamped steel. Length of lever: 1¼ inch. In center of travel lever points up. To close throttle move lever from you.

Choker: Location: In venturi. Type: Cone. Choker lever on left side. In open position points down. To close choker move lever from you.

Tube Support Bracket: Stamped steel. On air intake.

Gasoline Intake Needle: Square vertical. Needle seat: Standard vertical.

Gasoline Line: Size: ¼ inch. Type of connection: S.A.E.

Strainer Cap: Angled: Points away from you and down.

Remarks: Recommended setting for idle adjustment screw: Three-quarters to one and one-quarter turns open. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded.

Nash Single Six 400 1930 (Carter Model RTO8).—The Model RTO8 Carter carburetor is a multiple jet plain tube carburetor of the type usually designated as single adjustment. The fuel at high speeds being supplied through a fixed jet, while the mixture at low speed is controlled by an adjusting screw.

Maximum economy is obtained at approximately 30 miles per hour and minimum at wide open throttle.

The low speed jet assembly (Fig. 10) supplies gasoline to the motor at idling engine speed and up to approximately 18 miles per hour, gasoline flowing through a drilled passage connecting the low speed jet chamber with the carburetor well. At idle, gasoline is drawn through the low speed jet and idling port at the edge of the throttle valve. The idle adjusting screw regulates the amount of air entering this port. Backing this screw out admits more air and consequently makes the idling mixture leaner. (See Fig. 11).

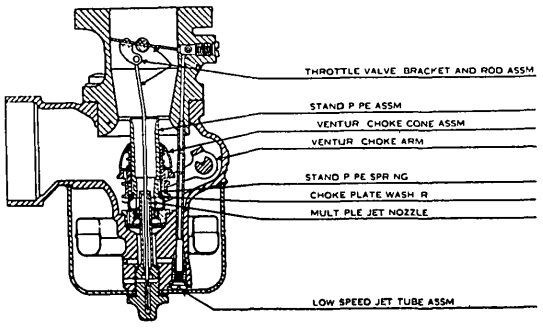

THROTTLE VALVE BRACKET AND ROD ASSM
STAND P PE ASSM
VENTUR CHOKE CONE ASSM
VENTUR CHOKE ARM
STAND P PE SPR NG
CHOKE PLATE WASH R
MULT PLE JET NOZZLE
LOW SPEED JET TUBE ASSM

Fig 10

Cross sectional view of Carter carburetor Model RTO8 showing the multiple jet nozzle metering rod and idling system The fuel for low and idling speeds is drawn from the gasoline well through the idling tube up to the idle chamber opposite the edge of the throttle

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber The well jet in the side of the body feeds gasoline to the carburetor well From this well a combination of gasoline and air is drawn into the nozzle chamber through the accelerating jets on the side of the nozzle intermingling with fuel from the vertical jet, the combination forming a fine spray which is carried by the standpipe to the venturi, or main air passage, where it is absorbed by incoming air, forming a mixture upon which the engine operates The jets on the side of the nozzle come into operation in direct proportion to the throttle position The further the throttle is opened, the more jets are in operation At wide open throttle, all jets are working and the engine is getting the maximum fuel supply possible

The size of the vertical jet is regulated by the fuel metering rod (Fig 10) which is attached to the throttle valve. This rod working directly with the throttle meters accurately the correct amount of fuel for every throttle position.

Carburetor Specifications

The following table contains complete carburetor specification information for Carter Model RTO8 used on Nash Single Six 400 1930 automobiles To read, hold carburetor air intake from you

Make of Engine: Nash No cylinders 6 Four cycle

Carburetor Model: RTO8 Size 1⅛ inch Body finish Duco or equivalent Brass bowl

Size of Main Venturi: 1 1/32 inch Upper well depth from standpipe seat ¼ inch Lower well, diameter 7/16 inch

Standpipe: Flare top 7/16 I D with 5/16 inch venturi One No 46 air hole in base Two air slots 250 to 254 inch high by 380 to 385 inch wide

Low Speed Jet: No 66 drill By-pass No 56 drill Economizer No 55 drill

Float Level: Top of float to be 11/16 inch from machined surface of casting, opposite needle seat

Accelerating Pump: Type Delayed action Stroke Summer setting 17/64 inch approximately Winter setting 17/32 to 9/16 inch Discharge jet size No 74 drill Feed to ball check size No 45 drill

Inside Vent: No 50 drill Outside vent None

Idle Port Opening Above Valve with Valve Tight Closed: 040 inch to 052 inch

Idle Port: Length 176 inch Width 040 inch

By-Pass Hole Under Port: No 55 drill

Type of Idle: Air bleed

Main Well Jet: Size No 56 drill Auxiliary Jet None

Nozzle: Vertical No 48 drill Top jet No 26 drill

ACCELERATING JETS	Number	Drill Size	Distance from Top of Tube
(Combination No 64)	2	56	9/16 inch
	2	56	⅝ inch
	2	53	¾ inch
	2	69	15/16 inch
	2	53	1⅛ inch
	2	47	1⅜ inch

Feed to Vertical Jet: No 44 drill

Metering Rod: Diameter Top 066 Bottom 051 Length 4 57/64 inch

Throttle Lever: Location Left side Type Stamped steel Length of lever 1¼ inch In center of travel lever points up To close throttle move lever from you

Choker: Location In venturi Type Compensating Cone Choker lever on left side In open position points down To close choker move lever from you

Tube Support Bracket: Stamped steel On air intake

Gasoline Intake Needle: Square vertical Needle seat Standard vertical

Gasoline Line: Size ¼ inch Type of connection S A E Elbow

Remarks: Recommended setting for idle adjustment screw One-half to one turn open To make mixture richer Turn adjustment screw in Do not idle engine below 300 R P M with spark retarded

MARVEL CARBURETORS

Two types of Marvel carburetors have been used on Nash automobiles from 1925 to 1930 inclusive Carburetors used on models from 1925 to 1929 inclusive were of the two nozzle type while those used on 1930 models are of the three nozzle type

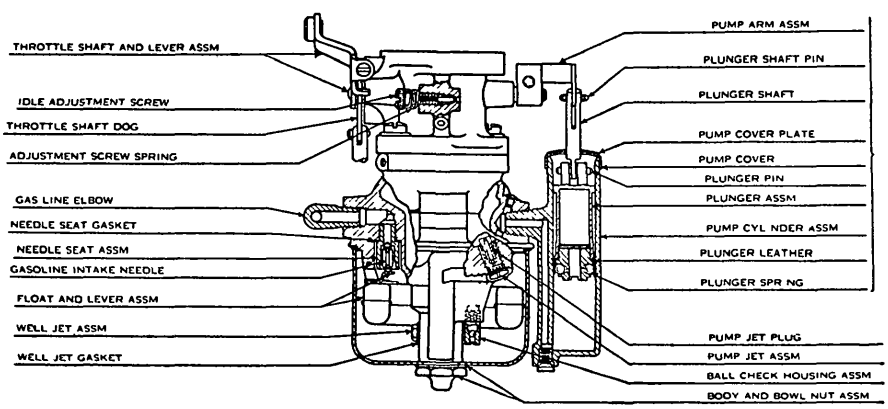


Fig 11

Cross sectional view of Carter Model RTO8 showing idling adjusting screw and new type of accelerating pump This carburetor has only one adjustment for idling speed

The carburetor is composed of a main body or mixing chamber and a conventional float chamber bowl with fuel strainer attached at the point of entrance of the fuel to the bowl. On the two nozzle type carburetor, one nozzle, the low speed nozzle, is mounted directly under the venturi block and the other nozzle called the high speed nozzle is mounted under the air valve.

On the three nozzle type, the low speed nozzle is mounted directly under the venturi block and the high speed and intermediate nozzles are mounted under the air valve. The construction of the two nozzle type of Marvel carburetor is shown in Fig. 12 and the three nozzle type of carburetor is shown in Fig. 13.

An air screw is provided as shown in the illustration which regulates the pressure of the air valve spring enclosed therein. Within this screw is also enclosed a plunger connected by a link to the air valve. The function of this plunger is to provide a resistance in addition to that of the air valve spring to assist in acceleration. This arrangement of plunger and air valve screw is termed the dash pot.

A further control of the high speed jet is provided by the economizer which is a fuel metering valve operated by the carburetor throttle. This valve provides maximum fuel feed to the high speed nozzle when the throttle is fully opened for high speed, high power and for quick pick-up. During the ordinary driving ranges, this valve controls the amount of fuel being used, thus providing all the economy possible. This valve is entirely automatic and requires no adjustment.

A choke button is provided on the instrument board to assist in starting. Pulling out this button closes a butterfly valve in the air intake passage of the carburetor which restricts the air opening on the carburetor and consequently produces a richer mixture. This button should be released part way at once upon starting and fully released as soon as the engine will run without it.

A control lever is also placed on the instrument board to provide for manual regulation of the heat control in addition to the automatic heat control mechanism of the carburetor. For more complete information regarding heat control see information in Carburetor Adjustment section.

Specification Diagnosis

(Marvel 2 and 3 Nozzle Carburetors)

Jet sizes for Marvel carburetors used on Nash automobiles are determined by flowmeter measurement. These carburetors are calibrated at the factory and are not intended to be changed. The specification diagnosis consists mainly of inspecting the parts for wear.

Inspection Instructions.—In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle, thoroughly clean all jets and passageways and inspect for worn parts. Do not, under any consideration, change any of the jet sizes or openings.

Air Adjusting Screw: Inside of screw should be smooth. Clearance between the plunger and shell should not exceed .006". Cases may be encountered in service where a correct carburetor adjustment cannot be obtained due to the fact that the air valve plunger sticks in the air valve screw. When this trouble is encountered, polish the inside of the air screw and the plunger with a good grade of metal polish. (Never use grinding compound or sandpaper), and if this does not correct the trouble, replace with new parts.

Air Valve Spring Specifications: If the air valve spring is made with a number of closed coils at the center section and is zinc plated it should have a free length of 1½". If the air valve spring is made without a number of closed coils at the center, it should have a free length of 1 1/16". (See information below under Air Valve Spring).

Air Valve: The air valve should be free on its shaft but have very little play. Contact of the valve against the carburetor body should show contact for the entire curved portion.

Air Valve Spring (Marvel 2 and 3 Nozzle Carburetors).—The following diagnosis information is intended only to enable the mechanic to determine whether or not the carburetor calibration parts have been tampered with or changed in any way and under no consideration should jet openings, passageways or air valve springs be changed.

The air valve spring is located in the air valve adjusting screw between the head of the air valve plunger and the adjusting screw. The air valve spring is a calibrated part, the purpose of which is to control the action of the air valve through the full range of operation of the carburetor and if difficulty is encountered, the spring should be replaced with a new one.

Diagnosis, Air Valve Spring Weak or too Short.—If the air valve spring is weak or too short, the car owner will probably complain of a poor idling condition and that the motor has no power or pick-up. The idle adjustment should be approximately correct when the head of the adjusting screw is flush with the ratchet spring and if it should be necessary in order to make the car idle properly to screw the adjusting screw in an excessive amount, the air valve spring will probably be found to be weak.

On the other hand, if someone has stretched the air valve spring or has replaced it with a spring of the wrong dimension, the car may idle properly but hesitate and Roll at speeds and on acceleration.

Do not, under any consideration, attempt to correct a condition caused by a weak air valve spring by stretching the spring. These springs are especially constructed to deliver a certain amount of resistance to the air valve plunger at various speeds and if the original spring is stretched or distorted in any way, it will not work properly and will throw the carburetor out of balance.

Main Discharge Jet (Marvel 2 and 3 Nozzle Carburetors).—The following diagnosis information is intended only to enable the mechanic to determine whether or not the carburetor calibration specifications have been changed or tampered with in any way.

The main discharge jet or low speed nozzle is mounted under the venturi block and furnishes fuel to the motor at idling and low speeds.

Diagnosis, Low Speed Nozzle too Small.—A low speed nozzle that is too small will cause the motor to hunt or run rough from a lean mixture. To check out this condition, start with the air valve screw set flush with the ratchet spring; that is, the end or head of the air valve adjusting screw should be just even with the end of the ratchet spring. Next screw the air valve screw in one turn. If the motor still runs rough, the main discharge jet is probably too small. When the carburetor is properly adjusted, the air valve just hangs off its seat and screwing the air valve adjusting screw in one full turn pushes the air valve over against the wall of the carburetor. This shuts off the air and has a tendency to draw more gasoline from the main jet.

Caution: Before changing the jet to a larger size, make sure that the nozzle opening is not plugged up with dirt. Never change a nozzle size by drilling.

Diagnosis, Low Speed Nozzle too Large.—A low speed nozzle that is too large will generally cause the motor to Roll and load. To check for a low speed nozzle that is too large, set the head of the air valve adjusting screw flush with the end of the ratchet spring. Next screw the air valve screw out one full turn from this position. If the motor has a tendency to smooth out, the low speed nozzle may be too large but in extreme cases the motor may still Roll and load even after the spring tension has been released.

In either case, whether the main discharge jet is too large or too small, the motor may have a tendency to die after acceleration.

High Speed Jet (Marvel 2 and 3 Jet Carburetors).—The function of the high speed and intermediate jets located under the air valve is to supply fuel to the motor at high speeds in conjunction with the low speed jet mounted under the venturi block. The action of the high and intermediate jets is controlled by the automatic air valve and the fuel metering valve which is operated by the carburetor throttle. The metering valve provides the maximum fuel feed to the high speed nozzle when the throttle is fully opened for high speed, hill power and for quick pick-up. This valve is entirely automatic and requires no adjustment.

On three jet carburetors, the two jets under the air valve are calibrated and balanced at the factory to deliver the proper amount of fuel through the full range of the carburetor. The high speed jet will generally be found to be slightly smaller than the intermediate jet and the intermediate jet is shorter than the high speed jet. For diagnosis purposes, the high and intermediate jets may be considered as one jet.

Diagnosis, High Speed Nozzle too Small.—A high speed jet or nozzle that is too small will cause the motor to run rough at intermediate speed and lack power under full load or at high speed, generally accompanied by backfiring through the carburetor and fittings. This condition will also have a tendency to cut down the revolutions per minute of the motor under a full throttle service floor test.

Diagnosis, High Speed Nozzle too Large.—A high speed nozzle that is too large will generally be indicated by low gasoline mileage. In extreme cases where the jet is much too large, the carburetor may have a tendency to Roll and load on a hill. However, if the trouble is not exaggerated enough to cause the motor to Roll and load, the only symptoms will be low gasoline mileage. To check the trouble, try a smaller high speed nozzle.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
NASH					CARTER
1926	Light Six	Own	6	3 "x4 "	DRO-75S 1"
1927	Light Six	Own	6	3 "x4 "	DRHO-82S 1"
1928	Standard Six	Own	6	3 1/8"x4 "	DRJHO8-123S 1"
1929	Stand 6 (400)	Own	6	3 1/8"x4 "	RTO8-134S 1 1/8"
1930	Single Six	Own	6	3 1/8"x4 3/8"	RTO8-147S 1 1/8"
					MARVEL
1925	Spec. 6 (131)	Own	6	3 1/8"x4 1/2"	UU3 S-1 1/4"
1925	Adv. 6 (161)	Own	6	3 1/4"x5 "	U 4 S-1 1/4"
1926	Spec 6	Own	6	3 1/8"x4 1/2"	U 38-1 1/4"
1926	Adv. 6	Own	6	3 1/4"x5 "	U 4 S-1 1/4"
1927	Spec 6	Own	6	3 1/4"x4 1/2"	U 38-1 1/4"
1927	Adv. 6	Own	6	3 1/4"x5 "	U 4 S&M-1 1/4"
1928	Spec 6	Own	6	3 1/4"x4 1/2"	U-1 1/4"
1928	Adv 6	Own	6	3 1/4"x5 "	U-1 1/4"
1929	Spec. 6	Own	6	3 1/4"x4 1/2"	UXM-1 1/4"
1929	Adv. 6	Own	6	3 1/4"x5 "	U-1 1/4"
1929	Standard	Own	6	3 1/8"x4 "	VN-1 1/8"
1930	Twin Ign. 6	Own	6	3 3/8"x4 1/2"	U 3-1 1/4"
1930	Twin Ign. 8	Own	8	3 1/4"x4 1/2"	C 4-2"

ADJUSTMENT PRECAUTIONS

Gasoline mileage and motor performance are dependent more than ever before upon correct tune-up and carburetor adjustments. Especially is this true of Nash models equipped with Twin Ignition; therefore it is suggested that the special information with reference to tune-up at the front of this section and the special adjustment information found below be closely observed.

Affect of Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained.

Do not attempt a carburetor adjustment before the intake manifold and motor are thoroughly warmed up.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. While a too lean adjustment is not the most economical, richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Air Valve Failure.—On Nash cars equipped with Marvel carburetors, a failure of the air valve action may be the result of a weak air valve spring. This spring is located just under the air valve adjustment screw and provides the tension against

which the air valve piston works. If this spring becomes weakened in service or is too short, the action of the air valve will be affected.

Never, under any consideration, should this spring be stretched. If it is found to be too short or has weakened in service, replace with a new spring of the correct dimensions. (See Carburetor Specifications).

Hole in Manifold Riser.—Failure to obtain a correct carburetor adjustment may be due to a hole burned in the intake manifold riser.

When this trouble is encountered, remove the old riser and replace with a new one.

CARTER CARBURETORS

The adjustment procedure for all models of Carter carburetors used on Nash automobiles from 1925 to 1930 inclusive is practically the same with the exception that on the early model carburetor, two adjustments were used. One, the idle adjustment, was located in the side of the carburetor body just below the carburetor manifold flange and controls the amount of air admitted to the idling or low speed jet, while the other adjustment, the high speed adjustment, was located in the side of the body just above the float bowl and controls the supply of gasoline to the carburetor well. Carburetors used on late model Nash cars have only one adjustment, the idle adjustment, which is located in the side of the carburetor body just below the carburetor manifold flange and controls the amount of air admitted to the idling mixture. A cutaway sectional view showing the location of the idling adjustment on early model carburetors is shown in Fig. 9 and a sectional view showing the location of the high speed adjustment for early model carburetors is shown in Fig. 7 in the Carburetor Specification Diagnosis section. The location of the low speed or idling adjustment screw for late model carburetors having only one adjustment is shown in Fig. 11.

On earlier models the metering of the fuel was controlled entirely by the high and low speed adjustments, while on later models a metering rod which operates automatically to control the fuel delivered from the multiple jet nozzle has been added. This fuel metering rod is attached to the throttle valve and passes through the vertical jet regulating the amount of fuel supplied by this jet according to the position of the throttle. (See Fig. 8). This permits the carburetor to give the greatest possible mileage at part throttle position or at speeds at which the car is normally driven and to deliver maximum power when the throttle is wide open by automatically supplying a richer mixture at wide open throttle position.

The accelerating pump is another important feature on late model carburetors and complete information is given under the heading of Accelerating Pump below.

Carburetor Adjustment

(Early Models with High and Low Speed Adjustments)

Idle Adjustment.—Open the idle adjusting screw one-half to one and one-half turns (one-fourth to three-fourths of a turn on carburetors equipped with accelerating pump) or until engine hits evenly without loading or missing. Turning this screw in gives a richer mixture and turning it out a leaner mixture. (See Fig. 1 for location of idle adjusting screw).

The idle engine speed is regulated by the throttle lever adjusting screw. This acts as a stop for the throttle lever and prevents the throttle valve from closing too tight and allow the engine to stop when the accelerator is released.

With the hand throttle on the steering wheel closed, set the throttle lever adjusting screw so that the engine will run 300 R.P.M. If the engine runs too fast, back the adjusting screw out; if the engine runs too slow, turn the adjusting screw in until the proper speed is obtained. Be sure to lock this screw into position with the throttle lever adjusting screw lock nut.

High Speed Adjustment.—After the proper adjustment for low speed is obtained, set the high speed adjustment as follows: Back out the high speed adjusting needle (Fig. 7) from one to one and one-half turns from its closed position. Set the adjustment so that the motor will accelerate without spitting or loading. Best results in both performance and economy are obtained with the mixture set as lean as possible.

Screwing the high speed adjustment out richens the mixture and screwing it in leans the mixture. The needle can be set to secure any mixture ratio desired.

Carburetor Adjustment

(Late Model Carter Carburetors With Single Adjustment)

Idle Adjustment.—To adjust the idling mixture open the idle adjusting screw three-quarters to one and one-fourth turn or until the engine hits evenly without loading or missing. Turning this screw in gives a richer mixture. The idle engine speed is regulated by the throttle lever adjusting screw. This screw acts as a stop for the throttle lever and prevents the throttle valve from closing too tight and allowing the engine to stop when the accelerator is released. With the hand throttle on the steering wheel closed, set the throttle lever adjusting screw so that the engine will run approximately 300 R.P.M. If the engine runs too fast, back the adjusting screw out. If the engine runs too slow, turn the adjusting screw in until the proper speed is obtained. The position of the idle adjusting screw is shown in Fig. 11.

ACCELERATING PUMP

The accelerating pump consists of an air chamber and a fuel container which has been added to the accelerating well. The pump is actuated by the throttle lever as shown in Fig. 11.

When the throttle valve is closed, the gasoline is drawn into the pump cylinder through the ball check housing assembly. The ball check automatically closes when the throttle is opened, and the air is compressed in the plunger which causes a fine spray of gasoline to be discharged into the venturi through the pump jet.

The discharge jet is a two piece jet equipped with a ball check (ball 3/32") and is easily cleaned in the event it becomes clogged up. About 3 seconds is required to discharge the contents of the pump supplying sufficient gas for acceleration under any and all conditions.

Leaks in the pump connection or dirt in the pump jet or ball check will interfere with its action. If the pump leather becomes dried out, apply a few drops of castor oil.

When the plunger is removed from the cylinder a special tool should be used for reassembling; otherwise the leather will be damaged.

MARVEL CARBURETORS

Two types of Marvel carburetors have been used on Nash automobiles from 1925 to 1930 inclusive. Carburetors up to 1929 were of the two nozzle type while 1930 models are of the three nozzle type.

The carburetor and manifold of all models have been designed to utilize the exhaust gases of the engine to insure complete vaporization and a consequence minimum consumption of fuel. This is accomplished by an exhaust gasket in a double walled riser placed between the carburetor and the intake manifold. This riser is connected to the exhaust manifold in such a manner that the exhaust gases are forced between the walls of the riser through the heat jacket and back to the exhaust manifold. The amount of heat thus furnished to the riser is controlled by a damper valve in the main exhaust located at the back of the riser at a point between the inlet and outlet of the riser exhaust jacket.

The damper valve in the main exhaust is connected to the throttle lever of the carburetor in such a manner that the greatest amount of heat is had in the jacket of the riser when the throttle is only partly opened, as in idling and at low speeds, and a decreasing amount as the throttle is opened further for higher speeds. By means of the heat control lever, an instrument on the instrument board, this automatic action of the damper heat valve may be varied to suit weather and driving conditions.

This lever controls the amount of heat sent to the riser jacket and an adjustment by moving the dash control lever to "no-heat" may be had to the point where no exhaust gas passes through the riser jacket thereby shutting off all the heat. When making a carburetor adjustment, extreme care should be exercised to see that the heat manifold control is working properly and that the manifolds are properly warmed up.

Carburetor Adjustment

(Marvel Two Nozzle Type Carburetors)

No change should be made in the carburetor adjustment until after an inspection has been made to determine if the trouble is in some other unit. It should be noted that the gasoline lines and strainers are clear, that there is gasoline in the vacuum tank, that there are no leaks at connections between the carburetor and engine, that the ignition system is in proper condition and that there is even compression in all cylinders.

Low Speed Adjustment.—Set the air screw (A) Fig. 12 so that the end is flush with the end of the ratchet set spring. Turn the gasoline adjustment (B) to the left very carefully until the needle head rests against its stop then turn to the right to bring the notch in the disc handle directly below the guide post above it.

The notch in the disc handle of the needle is put in the handle after the needle has been carefully calibrated by a flowmeter at the factory to the normal setting; therefore the notch in the handle should register with the guide post above it. This setting of the needle valve is absolutely essential to give the best results and is termed the normal setting because it is the standard fuel flow for this engine.

To provide for extremes of hot and cold weather a limited range of adjustment is provided on this needle (more than normal) by turning to the left until against the stop; or less than normal by turning to the right against the stop. These positions are only for extremes of hot and cold weather where an owner may desire a little more mileage for hot weather or a little quicker acceleration in

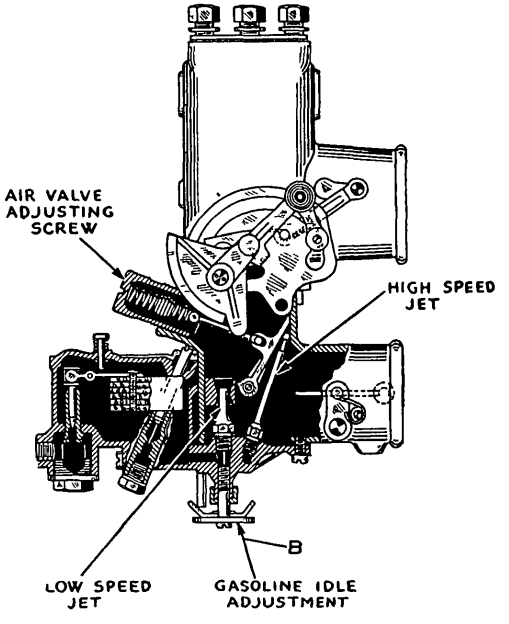


Fig.12

Cross sectional view of Marvel carburetor showing the high and low speed nozzles, air valve adjustment and gasoline idle adjustment. These carburetors are of the two nozzle type, the low speed or main nozzle being located directly under the venturi block and the high speed nozzle being located directly under the air valve.

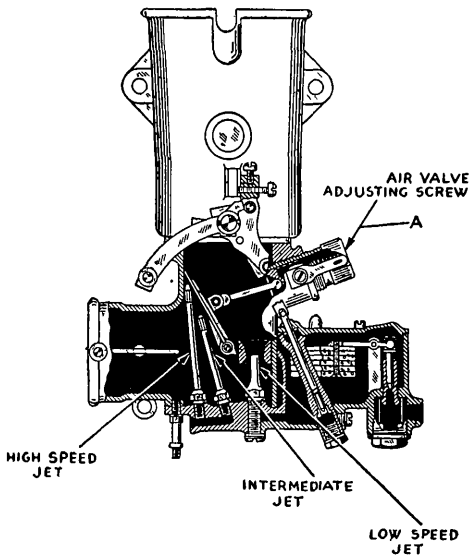


Fig 13

Cross sectional view of Marvel three jet type carburetor showing the air valve adjusting screw, the low speed jet, high speed jet and intermediate jet These carburetors do not have a gasoline adjustment.

zero weather and are not to be understood as necessary seasonal adjustments since satisfactory performance and mileage may be obtained in any kind of air temperature with the needle in normal at the notch. The heat control provides for atmospheric variations.

With the needle set at normal, set the heat control lever on the dash at the hot start position and leave in this position while making adjustment. Pull out the choker to closed position and start the engine in the usual manner. As soon as the engine has fired, release the choker. Run for a moment until the engine has warmed up, remembering to never use choker more than necessary when starting the engine.

High Speed Adjustment.—After the engine has been warmed up, set the air screw (A) Fig. 12 for good idle by either turning in to the right a little or backing out to the left as the needs of the engine require, remembering that first of all the needle (B) must be set as described above at normal warm up. The adjustment of the air screw for proper idling is easily accomplished by using a little care. If the air screw is turned in too tight, the motor will Roll. If the air screw is not tight enough, the motor will hesitate and perhaps stop entirely. To make a nice clean adjustment for idle, first having set the needle (B) at normal, turn the air screw (A) in one quarter of a turn at a time until the engine Rolls from too rich a mixture then turn back to the left until the engine hesitates from a lean mixture. Next, turn the air screw in to the right three or four notches at a time until the engine runs smoothly. If the engine idles too fast with the throttle closed, adjust by means of the throttle stop screw.

Carburetor Adjustment

(Marvel Three Nozzle Carburetors)

No change should be made in the carburetor adjustment until after an inspection has been made to determine if the trouble is in some other unit. It should be noted that the gasoline lines and strainer screens are clear, that the fuel pump is properly supplying fuel, that there are no leaks at connections between the carburetor and engine, that the ignition system is in proper condition and that there is even compression in all cylinders.

Air Valve Adjustment.—Set the air valve screw (A) Fig. 13 so that the end is just flush with the end of the ratchet spring. Set heat control lever on the dash to hot start position and leave in this position while making the adjustment. Pull out choker to closed position and start the engine in the usual manner. As soon as the engine has fired, release the choker part way immediately. Run for a moment until the engine has warmed up, remembering never to use the choker more than is necessary.

Next make the final setting of the air screw for good idle by either turning in to the right a little or backing out to the left as the needs of the engine require. With the engine warmed up, the adjustment of the air screw for proper idling is easily accomplished by using a little care. If the air screw is turned in too tight, the motor will Roll; if the air screw is not tight enough, the motor will hesitate and perhaps stop entirely.

To make a nice clean adjustment, turn the air screw in one-quarter of a turn at a time until the engine Rolls from a rich mixture; then turn back to the left until the engine hesitates from a lean mixture. Next turn the air screw in to the right three or four notches at a time until the engine runs smoothly.

If the engine idles too fast with the throttle closed, adjust to the desired speed by means of the throttle stop screw.

Oakland 1925-1930

Motor Tune-Up

When tuning an Oakland motor, special care should be given to checking and setting of ignition timing and on eight cylinder models, to synchronizing of the distributor contact points. These motors are very critical as to timing and should be carefully and accurately checked when tuning the motor. Make sure that the contact point surfaces are clean and square.

The special information following the motor tune-up operations should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
   Note: On 1930 V type motors the breaker contact adjustment should be done with extreme care. When adjusting the breaker points, remove both sets of points and square up contact point surfaces.
2. Check timing chain for slack; adjust if necessary.
   Note: The above operation is necessary only on 1925–26 and 1927 six cylinder models. On the 1928-29 six cylinder models and 1930 eight cylinder models, a short timing chain was provided with no chain adjustment.
3. Synchronize distributor points.
   Note: The above operation is necessary only on 1930 V type eight cylinder models.
4. Check ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan and generator belts; adjust if necessary.
   Note: When adjusting the fan and generator belts care should be exercised to see that the belt is not too tight. A tight belt will cause the fan to roar and will also cause the generator bushings to wear rapidly.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Check heat control valve.
10. Check throttle valve opening.
11. Check choke valve for position.
12. Check manifold gasket; see that all manifold flange nuts are tight.
13. Check high tension wiring.
14. Adjust carburetor.
15. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load condition.

Ragged Idle

Ignition Timing.—Of all the motor tune-up operations for Oakland, the most critical is ignition timing and on eight cylinder motors, synchronizing of the distributor points. If the ignition timing is not set correctly or the parts are not synchronized properly, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds.

To correct this condition, see information under Ignition Timing.

Valve Timing.—A ragged idling condition may be due to improper adjustment of the valves. The valve timing should be carefully checked and the tappets correctly adjusted (see Valve Timing Table for tappet clearances).

Warped Carburetor Flange.—Failure of the motor to idle properly may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly.

The carburetor should be removed from the manifold and the mounting flanges should be checked with a straight edge to see that they are perfectly square. If they are found to be out of true, square up with a flat mill file.

Soft gaskets should be used between the carburetor and manifold flanges and when bolting the carburetor to the intake manifold, extreme care should be exercised to see that both sides are drawn up evenly.

Carburetor Air Valve.—A poor idling condition may be caused by the air valve piston sticking. This air valve piston is located in the air valve adjusting screw and operates against the air valve spring. The trouble is generally indicated by the fact that it is difficult to obtain a correct adjustment. Also movement of the air valve adjusting screw does not have the proper effect on the air valve action.

To correct a condition of sticking air valve, remove the carburetor from the car and thoroughly clean. Polish the valve with any good grade of metal polish. Do not use sandpaper or any rough abrasive under any consideration. The inside of the air valve adjusting screw should be perfectly smooth and the clearance between the plunger and shell should not exceed .006".

On 1929 six cylinder models, extreme care should be exercised to see that the air valve closes properly and is not held open by the boss on the bottom of the air valve touching the side of the venturi. When this trouble is encountered, remove the venturi which is held into position by two small screws and file off sufficiently to allow a .010" clearance when the air valve is closed. When replacing the venturi, care should be exercised to see that it is not installed in an inverted position.

Lack of Power

Timing.—Lack of power may be caused by incorrect valve or ignition timing. Check both valve and ignition timing and on 1930 V type eight cylinder models, see that the breaker contacts are properly synchronized. (See Valve and Ignition Timing sections for timing information).

Low Gasoline Mileage

Air Valves.—A condition of low gasoline mileage may be caused by improper action of the carburetor air valve. Complete information will be found under Ragged Idle.

Motor Cutting Out On Pull

Distributor Breaker Arms.—A condition of motor missing or cutting out on a pull may be caused by a retarded action of the distributor breaker arms as the result of the breaker arm hinge pin binding in the bushing. Be sure that the breaker arm and breaker arm pin are clean and properly lubricated by a drop of light oil on the pin. If the bushing in the arm is worn, the arm should be replaced with a new one. A worn arm bushing is likely to cause the breaker arm to hang up on the pin which will render the arm inoperative.

Weak Coils and Condensers.—On late models, high speed, high compression motors, considerable strain is placed upon the coil and condenser especially if the spark plug gaps are not properly adjusted. If difficulty is experienced by the motor cutting out on a pull, check to see that the spark plug points are properly adjusted and that the ignition coil is not weak, or that the condenser is not defective.

Motor Noise

Exhaust Flange Packing Ring.—A confusing noise in the motor may be caused by a loose exhaust flange packing ring even though the flange appears to be tight. When repacking the flange, be sure to slide the metal packing ring out; insert the packing first and then move the packing ring in against the packing. Next bolt the exhaust pipe flange to the manifold, drawing it up evenly and make sure that it is tight.

OIL PRESSURE

Model and Year	Min	Max.
6-54—1925	5 lbs.	25 lbs
Six—1926-27	5 lbs	25 lbs
212—1928	5 lbs	25 lbs
AA6—1929	5 to 10 lbs	25 to 35 lbs
101—1930	*5 to 10 lbs.	25 to 40 lbs.

*If trouble is experienced in holding the oil pressure at idling speed on 1930 Oakland cars, renew the oil pressure plunger If a new plunger cannot be obtained, use the old plunger, squaring it up by driving the plunger against the seat by tapping it 2 to 3 good blows with the aid of a punch, also look for dirt on the seat and plunger To remove the oil plunger, use 7/16" tap

IGNITION TIMING

Oakland Model 6-54 1925.—The contact points should just start to separate 5 degrees, flywheel travel, before top dead center of the compression stroke. This timing position is obtained by cranking the motor until the flywheel mark UDC 1-6 is under the indicator in the flywheel housing. Next loosen the distributor body clamp screw and turn the distributor against rotation one half of a calibration as indicated by the graduated marks on the clamp plate. (See Ignition Timing Table for contact point clearances).

Ignition Timing Table

The following table contains complete ignition timing information for all models of Oakland from 1925 to 1930 inclusive For synchronizing information see Ignition Timing procedure.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
OAKLAND						
1925	6-54	025″	5°B	Autom	025″	1-5-3-6-2-4
1926-27	Six	020″	*IGN	Autom	025″	1-5-3-6-2-4
1928	212	020″	*IGN	Autom	025″	1-5-3-6-2-4
1929	AA 6	020″	T C	‡Ret	025″	1-5-3-6-2-4
1930	101	022″	†7°B	Autom	025″	1-4-5-2-7-6-3-8

Autom —Automatic spark advance B —Before top dead center
T C —Top dead center Ret —Spark lever fully retarded
*Flywheel mark "IGN" is stamped on the flywheel rim
†Flywheel is provided with ignition timing marks for cylinders Nos 1 and 7, 2 and 8, located 7° before the T D C position for each piston
‡Distributor is full automatic advance Pointer is provided at bottom of distributor body for advance or retard setting

Oakland Models O-6, GO-6 1926-27, and 212 1928.—The contact points should just start to separate when the flywheel mark IGN registers with the indicator in the peekhole in the flywheel housing with piston No 1 on compression stroke The spark control lever should be in fully advanced position (See Ignition Timing Table for contact point clearance).

Oakland Model AA-6 1929.—The contact points should just start to separate when the flywheel mark UDC 1-6 registers with the indicator in the peekhole in the flywheel housing with piston No. 1 on compression stroke. The distributor is of the full automatic type but is provided with a pointer at the bottom for advancing and retarding the spark. When setting the ignition, the pointer should be in the full retarded position. Road test car after the ignition timing operation is complete (See Ignition Timing Table for contact point clearance).

Oakland Model 101 (eight cylinder) 1930.—The stationary set of contact points should just start to separate when the flywheel mark IGN 1-7 is directly under the indicator in the peekhole in the flywheel housing, with piston No. 1 on compression stroke. Cylinder No. 1 is the first cylinder from the radiator in the left hand bank of cylinders. An advance and retard indicator and plate is provided at the base of the distributor body. When setting the ignition timing, the pointer should rest at the "zero" mark on the indicator plate. Both sets of contact points should be accurately adjusted and the points should be correctly synchronized if proper motor performance is to be obtained. (See Ignition Timing Table for contact point clearance).

To Synchronize Eight Cylinder Distributors with Four Lobe Cams and Two Sets of Contact Points.—This distributor has two sets of contact points one set mounted on a stationary base and the other set mounted on a movable base and arranged to break contact 45 degrees apart distributor shaft rotation which is equal to 90 degrees of flywheel travel.

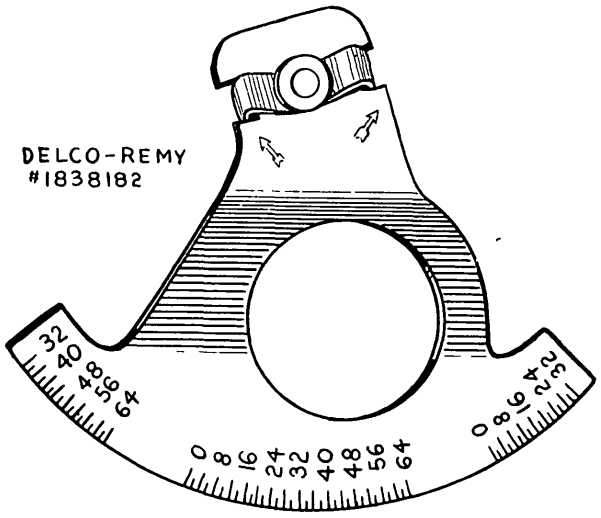


Fig. 1

View of Delco-Remy synchronizing tool No 1838182 used on Oakland automobiles When placing this synchronizing tool in position for synchronizing, be sure that the spring opposite the arrow which indicates the direction of rotation is inserted in the distributor shaft slot.

Adjust each set of contact points to the correct clearance as given in the Ignition Timing Table.

Use synchronizing tool No. 1838182, Fig. 3, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station. Rotate the distributor in the direction of rotation until the contact points on the stationary plate just open. This should be done with a test ammeter or lamp connected in series with the primary ignition lead. If an ammeter is used with the switch turned on, the ammeter needle will drop back to zero when the points break. If a test lamp is used, the light will go out when the points break. With the distributor shaft set at a point where the stationary contacts just separate, place the synchronizing tool over the cam with the spring closest to the arrow indicating the direction of rotation in the slot. (See Fig. 1). Scratch a mark on the side of the distributor housing in line with graduation 32 in the center of the tool.

Next rotate the shaft in the direction of rotation without removing the tool until graduation 32 on the end of the tool is even with the first mark made on the side of the distributor housing. Holding the distributor shaft in this position, adjust the movable plate by loosening the lock screws over the plate and turn the eccentric screw with a screwdriver until the movable set of points just open. Tighten the screws. Set the contact points for correct opening and repeat the entire operation for accuracy.

VALVE TIMING

Oakland Models 6-54 1925, Oakland Six 1926-27, 212 1928, and AA-6 1929.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .008". The intake valve for No. 1 cylinder should just start to open when the flywheel mark indicating top dead center for pistons 1 and 6 is approximately 1½ flywheel teeth past the indicator. Reset the tappets to the proper clearance after the timing operation is completed. (See Valve Timing Table for tappet clearance).

Oakland Model 101 Eight Cylinder 1930.—To check the valve timing, set the tappet clearance of No 1 intake valve at .012" The intake valve for No. 1 cylinder should just start to open when the flywheel mark indicating top dead center for pistons 1 and 7 is at the indicator of the peekhole in the flywheel housing. Reset the valve tappets to the proper clearance after the timing operation is complete. (See Valve Timing Table for tappet clearances).

Valve Timing Table

The following table contains complete valve timing data for all models of Oakland from 1925 to 1930 inclusive. All tappet adjustments are given for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
OAKLAND								
1925	6-54	008"		007"	007"	5°A	Opens	
1926-27	Six	008"		007"	007"	5°A	Opens	
1928	212	008"		008"	008"	5°A	Opens	
1929	AA 6	008"		008"	008"	5°A	Opens	
1930	101	012"		012"	012"	T C	Opens	

TIMING CHAIN ADJUSTMENT

Timing chain adjustment for Oakland Models 1925-26-27 is obtained by moving the generator. To adjust the timing chain, loosen the two upper generator support bolts and with the motor running, move the generator out or away from the motor until a slight hum is heard then move the generator in toward the motor until the hum just stops.

GAS LINE SCREENS

All models of Oakland equipped with vacuum tank fuel feed have two strainer screens in the gasoline feed system. One screen is located in the top of the vacuum tank and the other screen is located at the carburetor. To clean the gas line screen in the top of the vacuum tank, Fig. 2, dis-

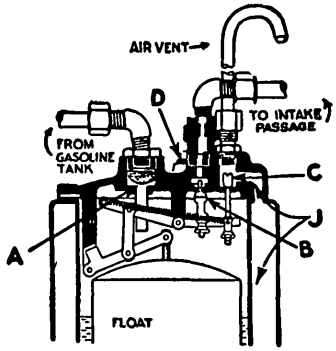


Fig 2

Upper half of vacuum tank showing position of gas line screens To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

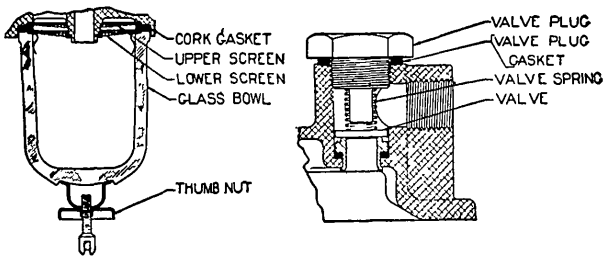


Fig. 3

Cross sectional view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held into position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

connect the feed line from the gasoline tank and remove the elbow and bushing. Clean the gas line screen in clear gasoline and blow dry with air.

All models of Oakland equipped with fuel pump feed have two strainer screens in the gasoline fuel system from the supply tank to the carburetor. One screen is located in the top of the bowl of the fuel pump and the other screen is located at the carburetor. To clean the fuel pump screen, Fig. 3, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new gasket.

Carburetor Specifications

FLOAT LEVEL

The float level information is arranged in the following paragraphs by carburetor model. To determine what particular model of carburetor is used on any particular model of car, either refer to the model designation on the side of the carburetor body or to the Motor Specification Table in the Carburetor Adjustment section for Oakland.

Marvel Carburetors

Marvel Models A2S, A3S and AA3S.—The fuel will stand at the correct height in the float bowl when the distance from the top edge of the float to the top edge of the float bowl measures 11/32". This measurement should be taken at a point farthest away from the float valve.

CARBURETOR SPECIFICATION DIAGNOSIS

The specification diagnosis information for cars equipped with Marvel carburetors consists mainly of a thorough inspection for wear of all parts when trouble is experienced. The jet specifications are determined by flow meter measurements and are not intended to be changed. These carburetors are correctly calibrated at the factory and should not be tampered with.

MARVEL CARBURETORS

Inspection Instructions. — In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle, thoroughly clean all jets and passageways and inspect as follows.

Air Adjustment Screw: Inside of the adjustment screw should be smooth. The clearance between the plunger and shell should not exceed .006". Cases may be encountered in service where an air valve plunger sticks in the air valve screw due to dirt or grit or to the surface of the air valve screw being rough. When this trouble occurs, remove the dash pot assembly and polish the inside of the screw and piston with a good grade of metal polish. Never use sandpaper or emery cloth. Wash all parts in clean gasoline and dry thoroughly after the cleaning operation is complete.

Air Valve Spring Specifications: If the air valve spring is made with a number of closed coils at the center section and is zinc plated, it should have a free length of 1½". If the air valve spring is made without a number of closed coils at the center, it should have a free length of 1 1/16". (See information below under Air Valve Spring).

Air Valve: The air valve should be free on its shaft but have very little play. Contact of the air valve on the carburetor body should show contact for the entire curved portion.

Air Valve Spring (Marvel Carburetors).—The air valve spring is located in the air valve adjusting screw between the air valve plunger and the head of the adjusting screw. The purpose of the air valve spring is to control the action of the air valve through the full range of operation of the motor.

Diagnosis, Air Valve Spring Weak or too Short.—If the air valve spring is weak or too short, the car owner will probably complain of a poor idling condition and that the motor has no power or pick-up. The idle adjustment should be approximately correct when the head of the adjusting screw is flush with the ratchet spring and if it should be necessary in order to make the car idle properly, to screw the adjusting screw in an excessive amount the air valve spring will probably be found to be weak.

On the other hand if someone has stretched the air valve spring or has replaced it with a spring of the wrong dimensions, the car may idle properly but hesitate and Roll at speeds and on acceleration.

Do not, under any consideration, attempt to correct a condition caused by a weak air valve spring by stretching the spring. These springs are especially constructed to deliver a certain amount of resistance to the air valve plunger at various speeds and if the original spring is stretched or distorted in any way, it will not work properly and will throw the carburetor out of balance.

Main Discharge Jet (Marvel Carburetors).—The main discharge jet or low speed nozzle furnishes fuel to the motor at idling and at low speeds. This nozzle is mounted in the center of the venturi block as shown at (B) Fig. 4.

Diagnosis, Low Speed Nozzle too Small.—A low speed nozzle that is too small will cause the motor to Hunt or run rough from a lean mixture. To check out this condition, start with the air valve screw set flush with the ratchet spring; that is, the end or head of the air valve adjusting screw should be just even with the end of the ratchet spring. Next screw the air valve screw in one turn. If the motor still runs rough, the main discharge jet is probably too small. When the carburetor is properly adjusted, the air valve should just

hang off its seat and screwing the air valve adjusting screw in one full turn, pushes the air valve over against the wall of the carburetor This shuts off the air and has a tendency to draw more gasoline from the main jets

Caution: Before changing the jet to a larger size, make sure that the nozzle opening is not plugged up with dirt

Diagnosis, Low Speed Nozzle too Large —A low speed nozzle that is too large will generally cause the motor to Roll and load To check for a low speed nozzle that is too large, set the head of the air valve adjusting screw flush with the end of the ratchet spring Next screw the air valve screw out one full turn from this position If the motor has a tendency to smooth out, the low speed nozzle may be too large but in extreme cases the motor may still Roll and load even after the spring tension has been relieved

In either case, whether the main discharge jet is too large or too small, the motor may have a tendency to die after acceleration

High Speed Jet (Marvel 2 and 3 Jet Carburetors) —The early models of Oakland cars were equipped with two jet type carburetors while the later models have three jets On the three jet carburetors the function of the high speed and intermediate jets located under the air valve is to supply fuel to the motor at high speeds in conjunction with the low speed jet mounted under the venturi block The action of the high and intermediate jets is controlled by the automatic air valve and the fuel metering valve which is operated by the carburetor throttle The metering valve provides the maximum fuel feed to the high speed nozzle when the throttle is fully opened for high speed, hill power and for quick pick-up This valve is entirely automatic and requires no adjustment

On three jet carburetors the two jets under the air valve are calibrated and balanced at the factory to deliver the proper amount of fuel through the full range of the carburetor The high speed jet will generally be found to be slightly smaller than the intermediate jet and the intermediate jet is shorter than the high speed jet For diagnosis purposes, the high and intermediate jets may be considered as one jet

Diagnosis, High Speed Nozzle too Small —A high speed jet or nozzle that is too small will cause the motor to run rough at intermediate speed and lack power under full load or at high speed, generally accompanied by backfiring through the carburetor and fittings This condition will also have a tendency to cut down the revolutions per minute of the motor under a full throttle service floor test

Diagnosis, High Speed Nozzle too Large —A high speed nozzle that is too large will generally be indicated by low gasoline mileage In extreme cases where the jet is much too large, the carburetor may have a tendency to Roll and load on a hill However, if the trouble is not exaggerated enough to cause the motor to Roll and load the only symptoms will be low gasoline mileage To check the trouble, try a smaller high speed nozzle

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Carburetor Adjustment

ADJUSTMENT PRECAUTIONS

The adjustment information for carburetors used on Oakland automobiles from 1925 to 1930 inclusive is given by carburetor model rather than by car model Refer to the table of Motor Specifications above if it is desired to know what make and model of carburetor was used on any particular car model

Motor Specifications

The following table lists the model and year of car, engine specifications, make, model and size of carburetor

Car and Year	Model	Engine	No Cyl	Bore and Stroke	Carb Model and Size
OAKLAND					MARVEL
1925 26 27	Six	Own	6	2 7/8"x4 3/4"	A2S 1"
1928	212	Own	6	3 1/4"x4 1/4"	A2S 1 1/4"
1929	AA6	Own	6	3 3/8"x4 1/4"	A3S 1 1/4"
1930	101	Own	8	3 1/16"x3 3/8"	D O 1 3/4"

Gasoline mileage and motor performance are dependent more than ever before upon correct tune-up and carburetor adjustment, therefore, it is suggested that the special information with reference to tune-up at the front of this section and the special adjustment information found below be closely observed

Effect of Manifold on Carburetor Adjustment. —It is important when making a carburetor adjustment that from 10 to 15 seconds time is allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained Insufficient time allowance is generally indicated by the motor performance gradually improving as the adjustment is changed and then the motor suddenly dying during the adjustment operation

Air Valve Failure.—Difficulty may be experienced in obtaining a correct adjustment due to a failure of the air valve action A failure of the air valve action may be the result of a weak air valve spring This spring is located within the air valve adjusting screw and provides the tension against which the air valve piston works If this spring becomes weakened in service or if too short, the action of the air valve will be affected

Never under any consideration, should this spring be stretched If it is found to be too short, or has weakened in service, replace with a new spring of the correct dimensions (See Carburetor Specifications)

MARVEL MODEL A-2-S

This carburetor consists of a main body or mixing chamber and a float chamber bowl with fuel strainer at point of entrance of fuel to bowl Within the mixing chamber are two jets which supply the amount of gasoline used in the mixture One of these jets called the low speed is situated in a small venturi and the other called the high speed is situated in a standpipe under the automatic air valve (See Fig 4) These jets are both of fixed

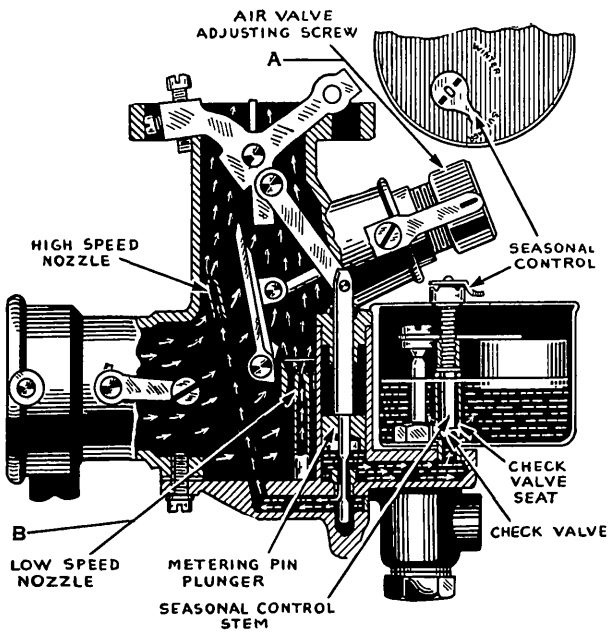


Fig. 4

Cross sectional view of Marvel two nozzle carburetor showing position of metering pin, low speed nozzle, high speed nozzle and air valve adjusting screw.

opening and non-adjustable. The air valve is of the hinged type and is connected by a rod to a plunger which moves in the air adjusting screw valve. The function of the plunger in this dash pot is to stabilize the action of the air valve and prevent its too rapid motion. Inside the plunger and the air screw is an air valve spring which regulates the pressure on the air valve and this controls the flow of gasoline from the jet. Adjustment of the air valve screw constitutes the only mixture adjustment on the carburetor.

Economizer Device.—The economizer device consists of a metering pin connected to the throttle lever which provides for a maximum power fuel supply at wide open throttle and a minimum fuel supply at normal driving speeds or at part open throttle. The economizer remains in action on level road driving up to approximately 50 miles per hour and is entirely automatic and requires no adjustment.

Accelerating Device.—Connected to the throttle and built in with the economizer is the accelerating device. On quick opening of the throttle the definite increase charge of fuel is forced from the high speed jet to provide for quick pick-up. On top of the fuel bowl will be found a small lever pointing to "Summer" or to "Winter." This provides for a maximum amount of accelerating charge for cold weather when set on "Winter" and a decreased amount for warm weather when set on "Summer," thus insuring maximum pick-up under the two extremes of weather conditions. This is not an adjustment but a seasonal control only and it has nothing to do with the fuel supplied by the jets other than the charge supplied on quick opening only of the throttle.

Carburetor Adjustment

(Marvel Model A-2-S)

There is only one adjustment provided on these carburetors which is an air valve adjustment as shown in Fig. 4.

First make sure that the seasonal heat control valve on the intake and exhaust manifolds is set correctly to provide the proper manifold heating for winter or summer. Likewise look at the top of the carburetor fuel bowl and see that the little lever is properly set for summer or winter as the case may be.

After the motor has been thoroughly warmed up, first set the air screw so that the top of it is just flush with the end of the ratchet spring bearing against it. Then obtain the proper idle setting by turning the air screw in a few notches until the engine Rolls through richness. Then turn out a few notches until the engine falters from a lean mixture. A point midway between these two positions will be found to be the proper setting. When the idle adjustment has been completed, the carburetor is in full adjustment for the complete range of the engine speed and load.

The adjustment may be facilitated if made first at engine speed equivalent to about ten miles per hour on the road and then checked afterward at the desired engine speed for idling.

MARVEL MODEL A-3-S

This carburetor comprises a main body or mixing chamber and a float chamber bowl with fuel strainer at the point of entrance of fuel to the bowl. Within the mixing chamber are three jets which supply the amount of gasoline used in the mixture. One of these jets called the low speed is situated in a small venturi and the other two called the high speed and intermediate high speed are situated under the automatic air valve. These jets are all of fixed openings and non-adjustable. The air valve is of the hinged type and is connected by a rod to a plunger which moves in the air adjusting screw shell. The function of the plunger in this dash pot is to stabilize the action of the air valve and prevent its too rapid motion. Inside the plunger and air screw is an air valve spring which regulates the pressure on the air valve and this controls the flow from the jets.

Economizer.—A further automatic control of the mixture is provided by the economizer which is a metering pin connected to the throttle lever which provides for a maximum power fuel supply at wide open throttle and a minimum fuel supply at all normal driving speeds at part open throttle. The economizer remains in action on level roads up to approximately 50 miles per hour and is entirely automatic and requires no adjustment. (See Fig. 4).

Accelerating Device.—Connected to the throttle and built in with the economizer is the accelerating device. On quick opening of the throttle a definite increased charge of fuel is forced from the high

speed jet to provide for quick pick-up. On top of the float bowl will be found a small lever pointing to "Summer" or "Winter." This provides for a maximum amount of accelerating charge for cold weather when set on "Winter" and decreased amount for warm weather when set on "Summer," thus insuring maximum pick-up under the two extremes of weather conditions. This is not an adjustment but a seasonal control only, and it has nothing to do with the fuel supplied by the jets other than the charge supplied on quick opening only of the throttle.

Carburetor Adjustment
(Marvel Model A-3-S)

Before attempting to adjust the carburetor, make sure that the seasonal heat control valve on the exhaust manifold is set correctly to provide the proper manifold heat for winter or summer as the case may be. Likewise look at the cap of the carburetor fuel bowl and see that the little lever is properly set for "Summer" or for "Winter."

Set the air valve adjusting screw, Fig. 5, so that same is flush with end of ratchet spring bearing against it. Then obtain the proper idle setting by turning the air screw in a few notches until the engine Rolls from a rich mixture. Then turn out a few notches until the engine falters from a lean mixture. A point between these two positions will be found to be the proper setting. When the idle has been thus properly set, the carburetor adjustment is complete for the full range of engine speed and load.

The adjustment may be facilitated if made first at engine speed equivalent to about 10 miles per hour on the road and then checked afterwards at the desired engine speed for idling for the final setting.

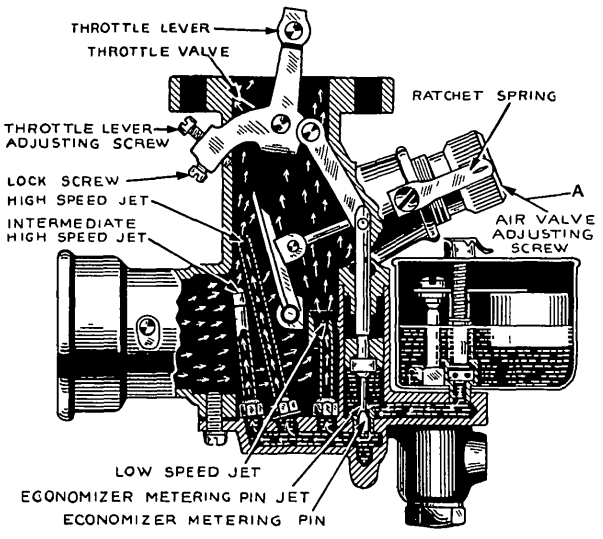


Fig 5

Cross sectional view of three nozzle Marvel carburetor showing the economizer metering pin assembly, air valve adjusting screw, low speed nozzle, high speed nozzle and intermediate high speed jet. Only one adjustment is provided on this carburetor which controls the fuel through the full range of operation of the carburetor.

MARVEL MODEL DO

Marvel Model DO carburetor is of the down draft, air valve expanding type used in conjunction with a specially designed manifold system which operates to properly govern the temperature of ingoing mixture of fuel and air at all operating speeds and loads.

The complete assembly consists of an air inlet casting bolted to the carburetor body or mixing chamber which in turn is fastened to the header assembly which carries the throttle, surrounded by an exhaust heating chamber or jacket. The fuel bowl is fastened to the carburetor body. The header assembly is bolted on each side also to both exhaust and intake manifold on the two engine blocks.

The carburetor proper has three nozzles delivering fuel into the mixing chamber and a spring controlled air valve. These nozzles are all of the fixed opening, non-adjustable type; one called the low speed is situated in a fixed air opening called the venturi. The other two called the primary and secondary high speed nozzles are located above the air valve and controlled by the same. (See Fig. 6). In addition to the above mentioned nozzles, there is an economizer metering pin jet which surrounds a fuel metering pin connected to the throttle. This metering pin controls the flow of fuel to the high speed nozzle at all part throttle speeds up to 55 or 60 miles per hour on level road and is fully automatic in its action and not adjustable.

Accelerating Device.—Built in with the economizer metering pin is the accelerating device. Quick opening of the throttle not only removes the pin from the jet but also forces a charge of fuel from all of the jets over a prolonged period.

The air valve is controlled by a plunger and connected to the same by a connecting rod. This plunger is surrounded by the air adjusting screw shell thus constituting a dash pot to prevent too quick opening of the air valve. Enclosed within the air valve screw is the air valve spring. Movement of the air screw against the spring constitutes the only mixture adjustment on the carburetor.

Carburetor Adjustment
(Marvel Model DO)

No change should be made in the carburetor adjustment until after an inspection has been made to determine whether the trouble is in some other unit. It should be noted that the gasoline lines and strainers are clear, that the fuel pump is properly supplying fuel, that there are no leaks at connections between the carburetor and engine and that the ignition system is in proper condition and that there is even compression in all cylinders.

If it should become necessary to test the adjustment or to make a readjustment, proceed as follows: Set the air screw, Fig. 6, so that the end is flush with the end of the ratchet spring. Set the heat control lever on the body in No. 1 position and leave in this position while making the adjustment.

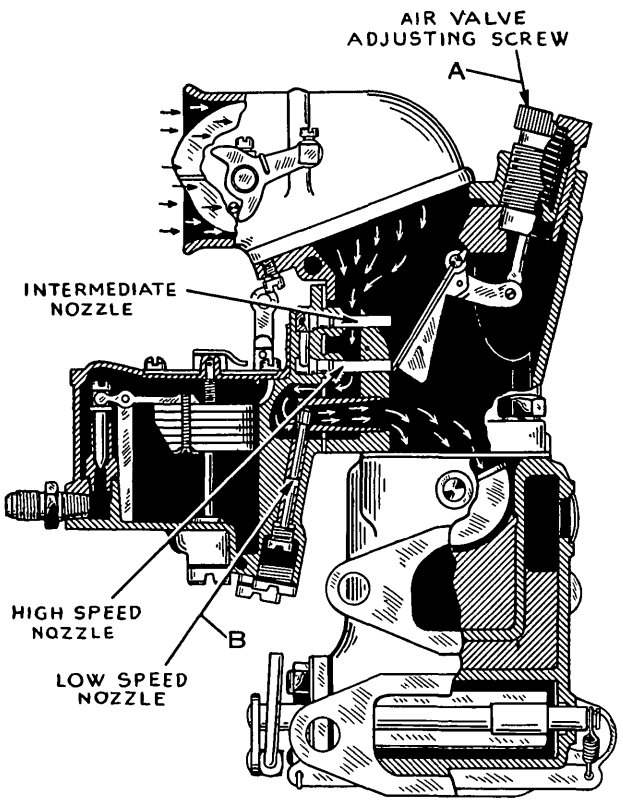


Fig. 6

Cross sectional view of Marvel Model DO carburetor used on Oakland automobiles. This is a three nozzle type carburetor having one adjustment as shown at (A).

Starting.—Open the throttle lever about one quarter way, pull out the choke button all the way and depress the starter pedal. As soon as the engine has fired, immediately release the choker part way and allow the engine to run at fairly good speed. If the engine hesitates, pull out the choker button momentarily again and allow the engine to run for a moment until warmed up, remembering never to use the choker more than is necessary.

Adjustment.—To make the final setting of the air screw for good idle, either turn in to the right a little or back out to the left as the needs of the engine require. With the engine warmed up the adjustment of the air screw for proper idling is easily accomplished by using a little care. If the air screw is turned tight, the motor will Roll. If the air screw is not tight enough, the motor will hesitate and perhaps stop entirely. To make a nice clean adjustment, turn the air screw in one quarter of a turn at a time until the engine Rolls as the result of a rich mixture; then turn back to the left until the engine hesitates indicating that the mixture has too much air and is too lean. Next turn the air screw in to the right three or four notches at a time until the engine runs smoothly.

If the engine idles too fast with the throttle closed, adjust to the desired idling speed by means of the throttle lever adjusting screw.

Altitude Changes

The nozzle sizes for best calibration have been carefully worked out by the Marvel and Oakland engineers; therefore, no changes should be made except in altitude territory. The automatic heat control is provided for the purpose of taking care of all seasonal and other temperature variations.

No change is necessary for touring through mountainous country but for cars operating permanently in territories of 4000 feet elevation or over, change the primary high speed jet to 49-140-C-28 and the secondary high speed jet to 49-240-E-28.

Do not, under any circumstances, make these changes unless operating permanently above 4000 feet elevation.

Caution: Always see that primary and secondary high speed jets are in their proper location.

Oldsmobile 1925-30

Motor Tune-Up

On late model Oldsmobile cars gasoline mileage and motor performance are dependent more than ever before upon a correct motor tune-up adjustment. This includes a complete and accurate check of the ignition timing, valve timing, spark plug and contact point settings as well as carburetor adjustment. The motor should be checked to see that the cylinders have good compression and that the compression in all cylinders is equal.

If trouble is experienced in obtaining good low speed performance on those models equipped with Johnson carburetors, check the following points: See that the air valve spring is not weak or defective. See that the economizer tube is not plugged up or that some one unfamiliar with Johnson carburetors has not drilled out the openings. Complete information covering this trouble will be found in the Carburetor Specification Diagnosis section.

The special information immediately following the tune-up operations should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: Models prior to 1926 have gear driven front end drives.
3. Check ignition timing; adjust if necessary.
4. Check valve tappet adjustment and adjust if necessary.
5. Clean gas line strainers and screens; also check gas lines for loose fittings.
6. Check fan belt; adjust if necessary.
   Note: Care should be exercised not to adjust the fan belt too tight. When the fan belt is too tight, there is an unnecessary downward pressure on the water pump shaft resulting in excessive wear on the bushings.
7. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
8. Check throttle valve for opening.
9. Check choke valve for position.
10. Check high tension wiring.
11. Adjust carburetor.
12. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Distributor Governor.—A poor idling condition may be caused by a weak or broken distributor governor spring. To correct this trouble, replace the old springs with new ones.

The governor assembly should be lubricated at least once every 500 miles by placing a few drops of oil on the felt wick at the upper end of the distributor shaft under the rotor.

Spark Plug Gap Settings.—A poor idling condition may be caused by improperly adjusted spark plug point gaps.

On Series E motors the spark plug gaps should be set to a uniform clearance of not less than .015″ nor more than .020″. On all other models set the spark plug gaps at from .018″ to .025″.

Warped Carburetor Flanges.—A poor idling condition may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Extreme care should be exercised when bolting the carburetor to the intake manifold to see that both sides come up evenly. The carburetor flange should be checked with a straightedge and if found to be out of true it should be squared up with a flat mill file. Always use a soft gasket between the carburetor and manifold flanges.

High Float Level.—A poor idling condition may be the result of an improper carburetor mixture due to a high float level. The float level should be checked and if found to be too high, should be reset to its correct position. (See Float Level adjustment in Carburetor Specification section).

Poor Acceleration

Accelerating Pump Failure. — On motors equipped with Schebler Model U carburetors a poor accelerating condition may be the result of the accelerating pump actuating rod working loose from the throttle valve. On the Model U Schebler the accelerating pump is operated from the throttle valve and it sometimes happens that this connection works loose thus causing the accelerating pump to become inactive.

When replacing the pump rod, care should be exercised to see that when the throttle valve is in closed position, the accelerating pump piston is at the bottom of its stroke.

Distributor Governor Assembly.—A lack of power and poor acceleration may be caused by the distributor governor assembly sticking or working loose. To correct the trouble, either replace the loose or broken part or free up the assembly by lubricating the part with a light engine oil.

Low Gasoline Mileage

Leaky Fuel Pump Diaphragm.—On models equipped with fuel pump feed, low gasoline mileage may be caused by a porous pump diaphragm. A small hole will be found in the side of the fuel pump just beneath the diaphragm flange. In the event the pump diaphragm becomes porous or leaky, the gasoline passes through the diaphragm and out through the hole in the pump body to ground. This trouble may also affect motor performance if the hole or leak in the diaphragm is of sufficient size to prevent the carburetor getting enough fuel.

This trouble may be checked out by either starting the motor and letting it run on the service floor

until the gasoline leaks from the hole in the pump body or in cases where the trouble has been present for some time, a white spot will be found on the sod or engine pan beneath the fuel pump.

To correct, remove the fuel pump and replace the diaphragm.

OIL PRESSURE

Model and Year	Min	Max
30—1925	10 lbs	35 to 40 lbs.
Six—1926-27-28-29	10 lbs.	30 to 35 lbs.
F-30—1930	30 lbs at 30 M P H	

IGNITION TIMING

Oldsmobile Models C 1925, D 1926, E 1927.—The contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke. The distributor used on these models is of the full automatic type and does not have a manual advance. To locate top dead center position of piston No. 1, use a rod or piston travel gauge. No timing marks are provided on the flywheel. (See Ignition Timing Table for contact point gap clearance).

Oldsmobile Models F-28 1928, F-29 1929, F-30 1930.—The contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke. The distributor is of the full automatic type and is provided with a calibrated plate and pointer at the base of the distributor body. To set the ignition, move the pointer to the retarded position on the plate and the contact points should be set so that they just start to separate with piston No. 1 at top dead center of the compression stroke After the timing operation is complete, reset the pointer to the "zero" mark at the center of the plate This represents the normal running position of 8° advance. (See Ignition Timing Table for contact point clearance).

Ignition Timing Table

The following table contains complete ignition timing data for Oldsmobile all models from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
OLDSMOBILE						
1925	C	.020″	*T C	Autom	.025″	1-5-3-6-2-4
1926	D	.018″-.022″	*T C	Autom	.025″	1-5-3-6-2-4
1927	E	.022″-.025″	*T C	Autom	.020″	1-5-3-6-2-4
1928	F-28	.020″-.025″	T C	†Ret	.025″	1-5-3-6-2-4
1929	F-29	.022″	T C	†Ret	.025″	1-5-3-6-2-4
1930	F-30	.022″	*T C	†Ret	.025″	1-5-3-6-2-4

Autom —Full automatic spark advance T C —Top dead center
Ret —Spark fully retarded
* There are no marks provided on the flywheel for valve and ignition timing Piston position must be determined by a rod or piston travel gauge
† Distributor is full automatic advance At the base of the distributor a calibrated plate and pointer is provided for accurately locating the distributor When setting ignition timing, the pointer should be at retard position after which it should be advanced 8° as indicated by the "O" mark on the plate

On Models F-28 and F-29 the flywheel is marked with a "O." This mark indicates top dead center for pistons numbers 1 and 6. Model F-30 is not provided with flywheel marks and the top dead center position for piston No. 1 must be determined by means of a rod or piston gauge through the spark plug hole.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for all models of Oldsmobile from 1925 to 1930 inclusive. All valve tappet clearances are given for hot motor unless otherwise designated

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Piston Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
OLDSMOBILE								
1925	C	.006″		.004″-.006″	.006″-.008″	*T C	Opens	
1926	D	.006″		.004″-.006″	.006″-.008″	*T C	Opens	
1927	E	.006″		.004″-.006″	.006″-.008″	*T C	Opens	
1928	F-28	.010″		.006″-.008″	.008″-.010″	T C	Opens	
1929	F-29	.010″		.006″-.008″	.008″-.010″	T C	Opens	
1930	F-30	.010″		.008″	.008″-.010″	*T C	Opens	

T C —Top dead center
* There are no marks provided on the flywheel for valve and ignition timing Piston position must be determined by a rod or piston travel gauge

Oldsmobile Models C 1925, D 1926, E 1927.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .006″. The intake valve should just start to open when No. 1 piston is at top dead center. There are no timing marks provided on the flywheel for these models, so that top dead center of piston No. 1 must be determined by means of a rod or a piston travel gauge through the spark plug hole. (See Valve Timing Table for proper clearances).

Oldsmobile Models F-28 1928, F-29 1929, F-30 1930.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .010″. The intake valve should just start to open at top dead center.

On models F-28 and F-29 the flywheel rim is marked with a top dead center mark for pistons Nos. 1 and 6. Models F-30 do not have flywheel marks and the top dead center position must be determined by means of a rod or piston gauge inserted through the spark plug hole. After the timing operation is complete, reset the tappet clearance to the correct setting (See Valve Timing Table for tappet clearances).

TIMING CHAIN ADJUSTMENT

To adjust the timing chain on all models of Oldsmobile from 1926 to 1930 inclusive, loosen the two top hexagon head screws that retain the generator to the front motor support. With the

motor running, move the generator away from the motor until a slight humming noise is heard. Then move the generator back toward the motor until the hum just ceases. After completing this adjustment, tighten the adjusting screws securely.

GAS LINE SCREENS

Oldsmobile all Models equipped with vacuum tank fuel feed have two gasoline strainers in the gas line from the fuel supply tank to the carburetor. One screen is located in the top of the vacuum tank and the other screen is located at the carburetor. To clean the gas line screen in the top

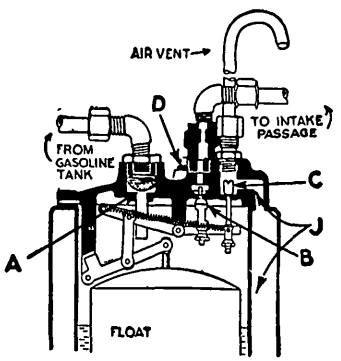


Fig 1

Upper half of vacuum tank showing position of gas line screens. To move, disconnect the feed line from the gasoline tank and screw out the hexagon bushing

of the vacuum tank, Fig. 1, disconnect the fuel feed line at the vacuum tank and remove the elbow and bushing together with the gasoline strainer. Wash in clean gasoline and blow clear with air.

Oldsmobile all Models equipped with fuel pump feed have two gasoline strainers in the gas line from the fuel tank to the carburetor. One screen is located in the top of the glass bowl of the fuel pump and the other is located at the carburetor. To clean the strainer screen in the fuel pump, remove the glass bowl and wash the screen in clean gasoline. When replacing the fuel bowl, make sure that the bowl gasket is in good condition and does not leak. When cleaning the gasoline strainer at the carburetor, make sure that the strainer screen body is clean before replacing the screen into position.

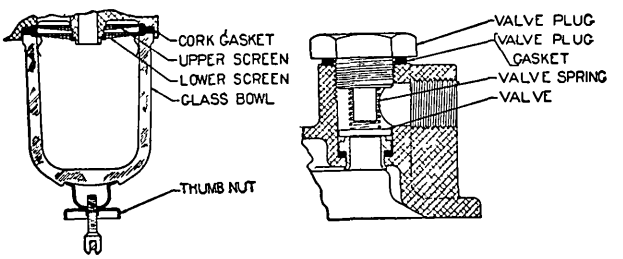


Fig 2

Cross section view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVEL

Schebler Carburetors

In our modern high compression, high speed motors with present day fuel, float level adjustment is an important factor in motor performance. Care should be exercised to see that the float level is adjusted with reasonable accuracy.

Schebler Model UX17-1¼".—With the float assembly in the lower half of the body, hold the body upside down with the float lever resting on

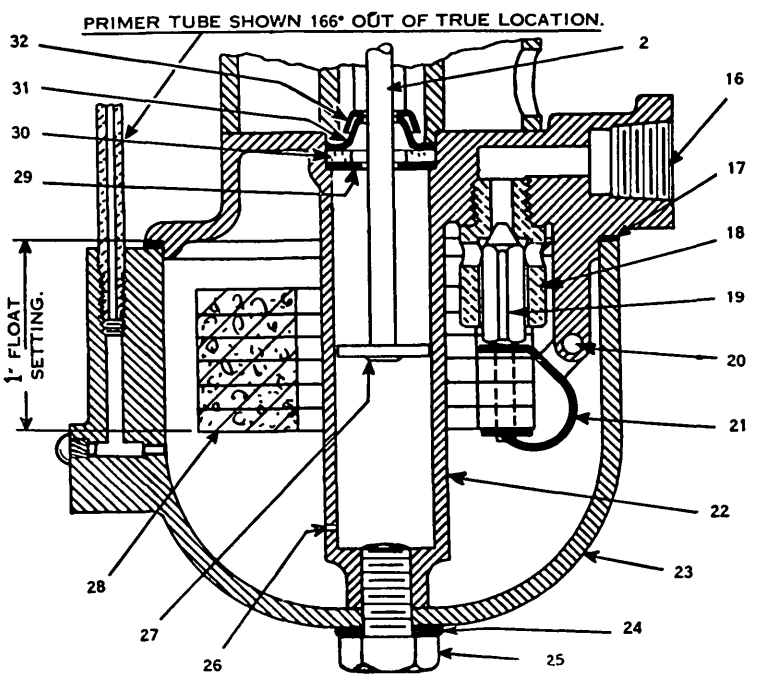


Fig 3

Cross section view of Johnson Model H float bowl showing the point at which the float level adjustment should be measured On the left side of the illustration, the cold priming tube is shown 160° out of its true location The purpose of this priming device is to provide an exceptionally rich or priming mixture for starting the engine in extremely cold weather This is a brass tube opening at its lower end into the float chamber and extending up into an air chamber which is cast on the side of the carburetor flange. The upper end of this air chamber cast on the side of the carburetor flange is closed by an expansion plug The lower end is opened to the atmosphere and a small diagonally drilled passage connects the air chamber with the throat of the carburetor above the throttle When the throttle is closed, as in the starting position, gasoline is drawn from the float bowl through the priming tube and emptied into the throat of the carburetor above the throttle

the float valve so that it is seated. The distance from the lower half of the carburetor body flange to the top of the float should measure 1 15/16". If it should be necessary to change the float level, bend the float lever arm up or down until the correct height is obtained.

On all new Model U Schebler carburetors, set the float level so that the float lever arm is parallel with the flange of the carburetor body when the needle valve is in the closed position.

Johnson Model H-1¼".—Fuel level will be correct when the lower edge of the float is 1" below the machined surface of the diaphragm body (see Fig. 3) with the float bowl gasket removed. This dimension should be uniform for the entire circumference of the float. All measurements should be taken with the float valve closed.

To adjust the float level, bend the brass float support up or down until the correct measurement is obtained.

CARBURETOR SPECIFICATION DIAGNOSIS

Two makes of carburetors have been used on Oldsmobile cars from 1925 to 1930 inclusive. Early models came equipped with Schebler carburetors while later models came equipped with Johnson carburetors.

The following paragraphs contain carburetor specification information for both makes of carburetors used on Oldsmobile cars and the information is arranged under the heading of the carburetors.

JOHNSON CARBURETORS

Johnson Model H carburetors used on Oldsmobile automobiles are of the plain air valve type provided with an economizer, accelerating pump, cold priming device and an interconnected throttle and choke. The fuel mixture is controlled chiefly by the action of an automatic air valve which takes care of the carburetor through its full range of operation. Each carburetor is correctly calibrated at the factory; therefore, the jet specification information consists chiefly of inspecting the carburetor for dirty or plugged up passageways and openings and worn parts.

Occasionally, jobs will be encountered where some one unfamiliar with Johnson carburetors has tampered with the calibration specifications by drilling out the economizer tube or by changing or stretching the air valve spring. Under no consideration should these parts be changed or tampered with in any way.

Inspection Instructions

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, thoroughly wash in clean gasoline and inspect as follows:

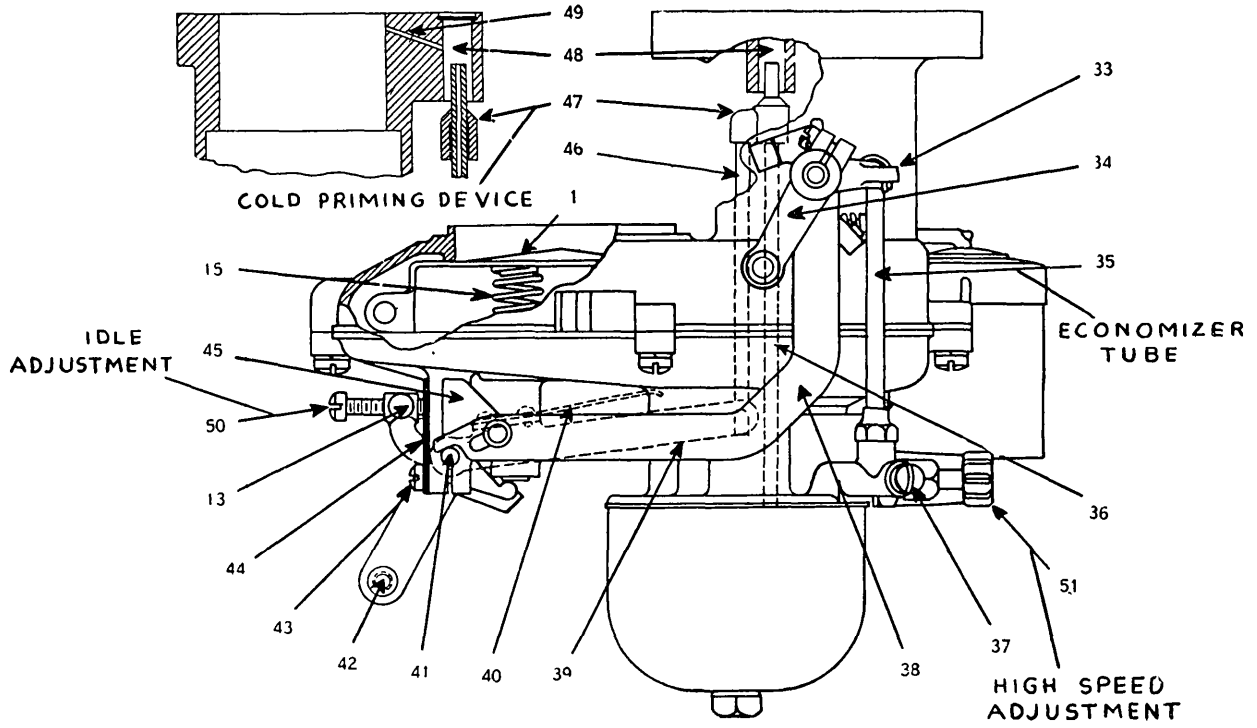


Fig. 4

Cross sectional view of Johnson Model H carburetor used on Oldsmobile automobiles showing the location of the idle adjustment, the high speed adjustment and the economizer tube The insert to the left upper corner is a cross section of the throat of the carburetor showing the arrangement of the upper end of the cold priming device. As the choke valve is closed, the sleeve (47) slides up to close the lower end of the chamber (48) thus gasoline is drawn directly from the float bowl through the cold priming tube and emptied into the throat of the carburetor through the passageway (49).

Warped Carburetor Body Parts.—Inspect the milled surfaces of the upper and lower body flanges where the two halves of the carburetor are bolted together to see that these flanges are not warped or distorted in any way

If the upper body flanges are warped it may distort the air valve seat, causing a leak at the air valve and thus throw the carburetor adjustment out of balance

Warped or distorted body flanges may be checked out by the use of a feeler gauge inserted between the upper and lower halves of the body before the carburetor is dismantled or by using a straightedge on the face of the flange after the lower half of the body has been removed To correct this trouble, replace the carburetor body

Air Valve Spring.—The air valve spring (15), Fig 4, is a calibrated part and should not be stretched or tampered with in any way Weak air valve springs will be most noticeable at high speeds causing a lean mixture If, when the carburetor is overhauled or dismantled for cleaning there is any doubt as to the condition of the air valve spring, it should be replaced with a new part

Economizer Tube.—The purpose of the economizer is to admit an air stream into the middle of the gasoline flow for economy The economizer tube (35) Fig 4 conducts air into a drilled passageway leading to the chamber (11), Fig 5, lying between the spray needle seat and the main jet At this point the air is mixed with the gasoline stream flowing upward through the main discharge jet The economizer is opened at idle and all throttle positions and car speeds up to approximately 55 miles per hour As the engine speed increases, the rate of air flow increases more rapidly than does the rate of gasoline flow, gradually bringing about a leaner condition, requiring that the air leaks through the economizer be stopped, thus transferring the vacuum directly to the high speed spray jet for open throttle condition At higher speeds or when additional power is required at low speeds, the opening motion of the throttle lever (34), Fig 4, produces a rotation of the throttle valve cross shaft and causes the economizer lever and cap assembly (33) floating on this shaft by means of a coil spring, to move to a position such that the cap closes the opening in the upper end of the economizer tube Additional opening of the throttle does not further affect the action of the economizer

Jobs may be encountered where someone unfamiliar with Johnson carburetors has drilled out the economizer tube opening which is a calibrated part On the base of each economizer tube stamped on the hexagon nut portion a number will be found which corresponds to the wire drill size of the tube If trouble is experienced with the motor loading or difficulty is encountered when attempting an adjustment, check to see that the openings in the economizer tube correspond with the drill size stamped on the base of the tube

Air Valve.—The air valve should be inspected for wear and loose hinges When the motor is not running, the air valve is closed, but when the motor is in operation, the air valve is continually off its seat and operates automatically to supply the requirements of the engine If the hinges are excessively worn or loose, the air valve may not operate correctly and thus upset the balance of the carburetor

Stabilizer Piston.—The automatic air valve is stabilized by a dash pot consisting of the brass piston, Fig 5, operating in a well of gasoline The piston is connected to the air valve by a plunger rod (8) The lower end of the stabilizer well is closed and the well is kept filled with gasoline by a drilled hole leading from the float chamber The piston fits loosely in the dash pot and permits gasoline to flow slowly from above the plate to below and vice versa A flat brass washer and a cup shaped brass washer between which is a felt washer loosely around the plunger rod (8) at the top of the dash pot A floating cup shaped brass washer lying above these three washers acts to exclude dust The space around the washer is open to the atmosphere The action of the

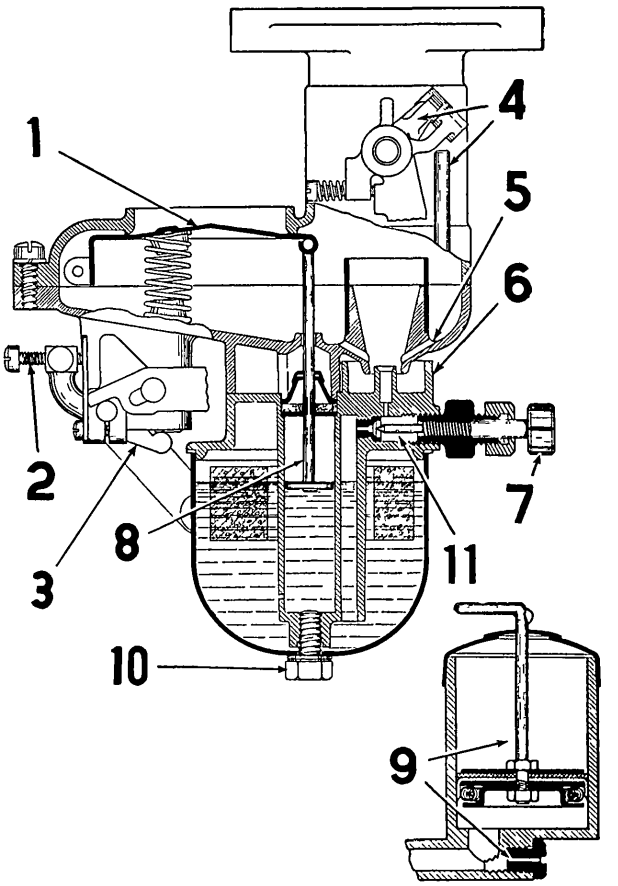


Fig 5

Cross sectional view of Johnson Model H carburetor used on Oldsmobile showing the location of the high and low speed adjustments, the air valve (1) and the economizer tube (4) In the insert in the lower right hand corner is shown the accelerating pump assembly

piston in the gasoline filled well provides a retarding force preventing fluttering of the air valve, particularly on open throttle and low speeds

When the carburetor is dismantled for any purpose, the stabilator piston assembly and washer should be inspected to see that they are in good condition

Accelerating Pump.—The accelerating pump is an integral part of the carburetor and is located on the side of the carburetor body (See insert Fig 5) The pump is in effect a single acting air pump in which a leather piston, expanded by a coil spring and supported by a suitable washer, is actuated by a plunger rod (9), Fig 5, connected to a lever mounted on the throttle valve cross shaft The piston slides in the cylinder which is opened to the atmosphere on the top and connected to an air passage leading into the upper part of the float chamber bowl

Air is forced on the downward stroke of the pump into the air space at the top of the float chamber Under normal conditions, the pressure on the gasoline in the float bowl is atmospheric due to the leakage of air through the air bleed This pressure is increased temporarily whenever the plunger in the pump is quickly forced down by quickly opening the throttle The action of the increased pressure in the float chamber causes a sudden increase of the rate at which the gasoline is forced to the nozzle slightly ahead of the air stream through the automatic air valve When the throttle is opened slowly, the air in the pump is forced out through the air bleed instead of into the float chamber so that the accelerating pump does not have any affect upon the mixture

Cold Priming Device.—The purpose of the cold priming device is to provide an exceptionally rich or priming mixture for starting the engine in extremely cold weather. A brass tube (36), Fig 4, (also see Fig. 3) opening at its lower end into the float chamber extends up into an air chamber (48), Fig. 4, which is cast on the side of the carburetor flange The upper end of this air chamber is closed by an expansion plug; the lower end is opened to the atmosphere and a small diagonally drilled passage (49) connects the air chamber with the throat of the carburetor above the throttle When the choke knob on the instrument panel is pulled out to the limit of its travel, the choke lever (42) bears against lever (39) causing an upward movement of its free end to which is attached a rod (46) and a priming valve (47) The upward movement of the priming valve closes the lower end of the air chamber (48) The suction of the engine then causes gasoline to be drawn from the float chamber up through the tube (36) through the passage (49) into the carburetor throat above the throttle, giving an extra rich priming mixture. As soon as the choke is pushed off slightly, the flat spring (40) pushes the lever (39) downward, causing the priming valve (47) to open the air chamber (48) As soon as the air is admitted to the air chamber, the suction on the gasoline tube (36) is broken, preventing a further flow of gasoline.

SCHEBLER CARBURETORS

Schebler Model U Series of carburetors were used on Oldsmobile 1928 and 1929. These carburetors are of the air valve type having two air inlets. The auxiliary air valve is closed for idling and wide open for full power. It is held in the closed position by a spring and will not open until the suction in the body of the carburetor is great enough to compress the spring. This spring is a a long, very flexible spring and is just strong enough to insure good atomization of fuel. The pressure required to open the air valve to its wide open position is very little greater than that required to barely crack it from its seat. Thus positive action at low speed is assured with the greatest possible capacity at high speeds.

The fixed air opening is through a venturi past the main nozzle. The air for the venturi passes through the same opening at the intake to the carburetor as the air which goes past the air valve. As it passes the main discharge nozzle it picks up the proper amount of fuel delivering it to the motor past the throttle disc. As the air valve opens, the air passing this valve mixes with the mixture delivered from the venturi and passes on into the motor. The fixed air opening through the venturi has two important parts to play. When the air valve is clamped down in the starting position and the needle valve is raised to the starting position, a very rich mixture is delivered out of the venturi, which produces a very good starting condition. When the carburetor is operating normally, the fixed air opening through the venturi creates a high air velocity past the nozzle and the fuel delivered out of the nozzle is torn up and atomized so that good low speed operation is obtained.

A complete description of the principle of operation and cross section views of Schebler Model U carburetors used on Oldsmobile will be found in the Schebler section in the back of this book.

The following tables include only those parts that are most likely to be at fault if a correct carburetor adjustment cannot be obtained.

Specification Tables.—The following specification tables contain the carburetor specifications for Model U Schebler carburetors used on Oldsmobile cars. These tables include only those parts that are most likely to be at fault if a correct carburetor adjustment cannot be obtained.

Oldsmobile Six 1928

(Schebler UX17 1¼" Engine 3 3/16"x4⅛")

Description of Part	Part No. or size
Air Valve Spring	*16–49–E
Needle Valve complete	†#9
Accel Pump Cross Passage	‡#52
Accel Pump Cylinder	#7

*The dimensions of the air valve springs are as follows No of coils 11, length 2", wire gauge 14

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #52 passage is the same size as a #52 wire drill The size of the passage is stamped on the side of the body of the passage.

Oldsmobile Six 1929

(Schebler UX24 1¼" Engine 3 3/16"x4⅛")

Description of Part	Part No or size
Air Valve Spring	*16–49–I
Needle Valve complete	†#10
Accel. Pump Cross Passage	‡#50
Accel. Pump Cylinder	#7

*The dimensions of the air valve springs are as follows No of coils 9, length 2¼", wire gauge 14

†The needle assembly number is indicated by the number of rings machined on the needle body

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A # 50 passage is the same size as a #50 wire drill The size of the passage is stamped on the side of the body of the passage

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
OLDSMOBILE					JOHNSON
1930	F-30	Own	6	3 1/16"x4⅛"	H-1¼"
					SCHEBLER
1928	Six	Own	6	3 1/16"x4⅛"	UX17 1¼"
1929	Six	Own	6	3 1/16"x4⅛"	UX24 1¼"

ADJUSTMENT PRECAUTIONS

On late model cars, gasoline mileage and engine performance are dependent more than ever before upon a correct tune-up adjustment. This includes a complete and accurate check of ignition timing, valve timing, spark plug and contact point settings as well as carburetor adjustments. The motor should also be checked to see that the cylinders have good compression and that the compression in all cylinders is equal. The tune-up information following the tune-up operations should be closely observed.

Effect of Intake Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the

manifold to pass into the motor. Especially is this true when making a range adjustment on Schebler Model U carburetors. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. Insufficient time allowance is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

Adjustment For Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. This is especially true of the idle and range adjustments and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment, there is a wide range between the points where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

Effect of Leaky Bowl on Adjustment.—On all Model U Schebler carburetors, a correct adjustment cannot be obtained unless the gasoline bowl is absolutely tight against the body flange. If the bowl has been removed for any reason, a new bowl gasket should be used and checked for leaks.

In every case where trouble is experienced, check the carburetor as follows: See that the power adjustment is set according to recommended factory setting and then check the economy and idle adjustment carefully. (See factory adjustment for Model U Schebler carburetors in the Schebler section in the back of this book). See that the idle tube is in place and not rubbing the needle valve lift lever. Inspect to see that the throttle shaft works freely and that the throttle disc closes correctly.

Air Valve Flutter.—Fluttering of the air valve may be caused by a weak air valve or dash pot spring. A weakened spring will also make a correct adjustment difficult with a tendency to a rich mixture at speeds above idling.

SCHEBLER MODEL U

The Model U Schebler carburetor used on Oldsmobile cars is very similar in operation to the Schebler Model S. Complete information on the principle of operation and factory adjustment will be found in the Schebler section in the back of this book.

JOHNSON MODEL H

The adjustment procedure for Johnson Model H carburetor used on Oldsmobile automobiles will be found in the following paragraphs. This carburetor has a high and low adjustment. The low speed or idle adjustment operates to control the air valve while the high speed adjustment located in the side of the bowl controls the amount of gasoline delivered to the main discharge nozzle.

High Speed Adjustment.—After the motor has been thoroughly warmed up, set the hand throttle so that the motor is running at approximately 30 miles per hour. Screw the high speed adjustment (51) Fig 4 in until the motor runs rough from a lean mixture and then back off the adjustment until the motor just smooths out.

Next gradually retard the throttle until the motor slows down to idling speed and with the motor running at this speed, make the idle adjustment.

Idle Adjustment.—With the motor thoroughly warmed up and operating at idling speed, screw the idle adjustment (50) Fig. 4 out until the motor runs rough from a lean mixture, then screw the idle adjustment in until the motor just smooths out. This adjustment should be made with the stop screw on the throttle valve set at a point where the motor will not die. After the idling adjustment is complete, reset the throttle stop screw to the desired idling speed.

Overland-Whippet 1925-30

Motor Tune-Up

If trouble is experienced in obtaining proper motor performance check the ignition and valve timing and spark plug point clearance. With present day fuels motor timing has become an important factor and should be done accurately.

The carburetor is the last unit that should be checked and the jets and passageways should not be drilled out or soldered up under any consideration. Special information covering carburetor trouble will be found in the special tune-up section immediately following the tune-up operations and under Adjustment Precautions in the Carburetor Adjustment Section.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: This operation is necessary only on those motors equipped with manual timing chain adjustment.
3. Check ignition timing; adjust if necessary.
4. Adjust the valve tappets and free up valves.
5. Clean gas line strainers and screens; also check gas lines for loose fittings.
6. Check fan and generator belts; adjust if necessary.
   Note: In order to avoid excessive wear on the pump shaft bushing, care should be exercised not to get the fan belt too tight.
7. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
8. Check heat control valve.
   Note: This operation is necessary only on late type motors with manifold heat control.
9. Check throttle valve for opening.
10. Check choke valve for position.
11. Check manifold gaskets; see that all manifold flange nuts are tight.
12. Check high tension wiring.
13. Adjust carburetor.
    Note: If difficulty is experienced in obtaining a correct carburetor adjustment, check to see that the main discharge jet is tight.
14. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Air Leaks at Carburetor Flange.—A poor idling condition may be caused by a warped carburetor flange. When this condition exists, air will be admitted into the manifold above the carburetor thus upsetting the balance of the carburetor adjustment. To check for this trouble, use a squirt can full of oil. If the gasket between the carburetor and manifold flange leaks, a change in motor operation will be noticed when oil is squirted over the flange.

To correct this trouble, remove the carburetor from the manifold, square up the flange with a flat mill file and replace the old gasket with a new one.

Air Leaks Around Throttle Shaft.—A poor idling condition may be caused by a badly worn throttle shaft. To correct this trouble, replace the old throttle shaft with a new one and install new cork gaskets.

Dirty Idling Tube Screen.—A poor idling condition may be caused by a dirty or plugged up idling tube screen. When this condition is encountered, the idling tube and screen should be removed and thoroughly cleaned with clear gasoline and air.

Loose Condenser.—An erratic idling condition may be caused by a loose condenser in the distributor base. To correct this trouble, tighten the condenser securely to the base.

Spark Plug Gap Clearance.—A poor idling condition may be caused by improper spark plug gap setting. The spark plug gaps should be set to a clearance of not less than .025″ nor more than .028″.

Valve Tappet Adjustment.—A poor idling condition may be caused by the valve tappets being adjusted too close and the valves holding open. Make sure that the tappets are correctly adjusted when the motor is hot. (See Valve Timing Table for correct tappet clearance).

Poor Acceleration

Improper Float Level Setting.—Poor motor acceleration may be caused by a high fuel level due to an improper float level adjustment. This trouble will generally be indicated either by gasoline leaking out of the carburetor or by the motor Rolling and loading on acceleration.

To correct this trouble readjust the carburetor float level. (See Float Level Adjustment). When making a float level adjustment, extreme care should be exercised to see that the float lever arm is not bent in such a manner that the full range of float movement is altered.

Lack of Power

Timing and Timing Chain.—Lack of power may be caused either by improper or incorrect ignition or valve timing caused by a loose timing chain on models equipped with chain drive front ends.

To correct this trouble, retime the motor and tighten up timing chain if found to be loose.

Low Gasoline Mileage

A high fuel level due to an improper float level adjustment will cause a loss in gasoline mileage. This trouble will generally be indicated by either a gasoline leak at the carburetor and in extreme

cases the motor will Roll and load on acceleration. (See Float Level Adjustment in Carburetor Specification section).

Improper Ignition Timing.—In order to obtain best motor efficiency the ignition timing must be absolutely correct. For timing procedure, see information under Ignition Timing

OIL PRESSURE

The oil pressure for all Overland and Whippet models from 1925 to 1930 inclusive should be adjusted to 15 lbs. minimum and 30 lbs. maximum.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing information for Overland and Whippet automobiles from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
OVERLAND						
1925-26	91-92	018″	T C	⅔ Adv	025″	1-3-4-2
1925-26	93	018″	1/32″B	Adv	025″	1-5-3-6-2-4
WHIPPET						
1926-27	96	.020″–.024″	1 3/64″B	Adv	025″	1-3-4-2
1927	93A	020″–.024″	1/32″B	Adv	025″	1-5-3-6-2-4
1928-29	96A	020″–.024″	T C.	Adv	025″	1-3-4-2
1928-29	98A	020″–.024″	1/64″B	Adv	025″	1-5-3-6-2-4
1930	96B	020″–.024″	T C	Adv	025″	1-3-4-2

Adv —Spark lever in fully advanced position B —Before top dead center T C —Top dead center

IGNITION TIMING

Overland Models 91, 92, 1925-26.—The contact points should just start to separate when No. 1 piston is at top dead center of the compression stroke. The spark lever should be set in two-thirds advanced position. (See Ignition Timing Table for contact point clearance).

Overland Model 93 1925-26, and Whippet 93A 1927.—The contact points should just start to separate when the flywheel mark indicating top dead center of the compression stroke for piston Nos. 1 and 6 is 19/32″ before the timing indicator in the inspection hand hole at the top of the clutch. The spark lever should be in the full advanced position. (See Ignition Timing Table for contact point gap clearance).

Whippet 96 1926-27.—The contact points should just start to separate when piston No. 1 is 1 63/64″, flywheel travel, before top dead center of the compression stroke. The spark control should be set in the full advanced position. (See Ignition Timing Table for contact point gap clearance).

Whippet Model 96A 1928-29, 96B 1930.—The contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke. The spark lever should be set in the full advanced position. (See Ignition Timing Table for contact point gap clearance).

Whippet Model 98A 1928-29.—The contact points should just start to separate when piston No. 1 is 13/16″, flywheel travel, before top dead center of the compression stroke. The spark control lever should be set in the full advanced position. (See Ignition Timing Table for contact point gap clearance).

VALVE TIMING

Overland Models 91, 92 1925-26, and Whippet Model 96 1926-27.—To check the valve timing, set the tappet clearance for No 1 exhaust valve at .006″. The exhaust valve should just close at top dead center of the exhaust stroke. (See Valve Timing Table for tappet clearances).

Overland Model 93 1925-26, and Whippet Model 93A 1927.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008″. The exhaust valve should just close when the piston is 31/64″, flywheel travel, after top dead center of the exhaust stroke. When the timing operation is complete, reset the valve tappet clearance. (See Valve Timing Table for tappet clearances).

Whippet Model 96A 1928-29, 98A 1928-29, 96B 1930.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .009″. The exhaust valve should just close when No. 1 piston is 13/64″, flywheel travel, before top dead center of the compression stroke. Reset the valve tappets to the correct clearance after the timing operation is complete. (See Valve Timing Table for tappet clearances.)

Valve Timing Table

The following table contains valve timing data for Overland and Whippet 1925 to 1930 inclusive. The tappet adjustment information is given for hot motor unless otherwise designated

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
OVERLAND								
1925-26	91-92		006″	006″	006″	T C		Closes
1925-26	93		008″	008″	.008″	*11/64″A		Closes
WHIPPET								
1926-27	96		006″	004″	006″	*T C		Closes
1927	93A		008″	008″	008″	*11/64″A		Closes
1928-29	96A		009″	004″	006″	*1/32″B		Closes
1928-29	98A		009″	004″	006″	*3/64″B		Closes
1930	96B		009″	004″	006″	*1/64″B		Closes

A —After top dead center B —Before top dead center T C —Top dead center

* Flywheel marks are provided on clutch side of flywheel rim Remove clutch inspection plate to check timing

TIMING CHAIN ADJUSTMENT

All Models of Whippet, except Model 93A, are provided with manual chain adjustment. The adjustment is made by loosening the generator strap and turning the generator eccentric collar in a clockwise direction until a very slight hum is heard. Then turn the collar back until the hum disappears. Tighten the generator strap after the adjustment operation is complete.

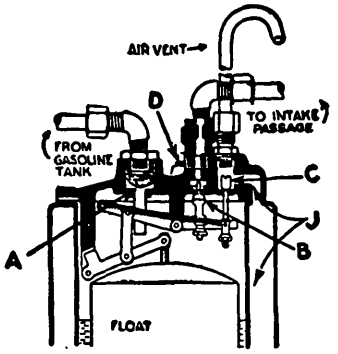


Fig. 1

The upper half of vacuum tank showing position of gas line screens. To remove the strainer screen, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

GAS LINE SCREENS

All Models of Overland and Whippet automobiles from 1925 to 1930 inclusive have come equipped with vacuum tank fuel feed. Two gas line screens will be found in the gasoline system from the supply tank to the carburetor. One screen is located in the head of the vacuum tank and the other is located at the carburetor. On models equipped with gascolators, a third gas line screen will be found in the gascolator. To clean the screen in the head of the vacuum tank, disconnect the feed line from the supply tank, remove the hexagon bushing and wash the screen in clear gasoline. (See Fig. 1).

Carburetor Specifications

FLOAT LEVEL

Tillotson Carburetors

Two points should be considered when checking the float level on Tillotson carburetors. One is the height of the gasoline level in the carburetor bowl and the other is the full movement of the float. In service, conditions may be encountered where someone unfamiliar with the proper carburetor calibration has attempted to make a float level adjustment by bending the lever arm. This practice generally will result in shortening the travel of the float, thus shortening the travel of the float valve. If the travel of the float valve is shortened, it causes the valve to fail to open wide enough to admit sufficient gasoline to supply the motor at high speeds, thus causing a condition of leanness as the result of a lack of fuel.

Tillotson 1″ Carburetors.—The float level adjustment for all 1″ Tillotson carburetors is the same. To determine the correct float level, remove the carburetor bowl cover. The level of the gasoline in the bowl should be exactly 13/16″ below the machined top edge of the float chamber. If the float level adjustment should be changed, do not bend the float lever but move the ferrule up or down on the needle. This can be done by placing the needle in a vise in such a way that the vise does not clamp the needle. Then tap the needle gently with a light hammer. Do this a little at a time so as not to get the ferrule too high on the needle. The carburetor should be clamped in the vise in a level position and the float level height tested before installing the carburetor on the car.

Tillotson 1¼″ Carburetors.—The float level adjustment for all 1¼″ Tillotson carburetors is the same. The level of gasoline in the carburetor bowl should be 15/16″ below the machined top edge of the float chamber. If it should be necessary to change the float level adjustment, do not bend the float lever arm but move the ferrule on the float needle. This can be done by placing the needle in a vise in such a way that the vise does not clamp the needle. Then tap the needle gently with a light hammer. Do this a little at a time so as not to get the ferrule too high on the needle. The fuel level height should be tested before reinstalling the carburetor on the car.

CARBURETOR SPECIFICATION DIAGNOSIS

In service, mechanics who do not understand Tillotson carburetors attempt to improve the performance by drilling out the nozzle openings. This should never be done under any consideration. The adjusting needle is for the purpose of varying the gasoline mixture and takes care of the carburetor through its complete range of adjustment.

It should be mentioned here that if trouble is experienced in obtaining a correct carburetor adjustment, before tampering with the carburetor make sure that all jets and passageways are free of dirt; also that all units such as ignition, spark plugs and ignition timing are correct; also check all items given in the tune-up precautions immediately following the Tune-Up Operations at the front of this section.

TILLOTSON CARBURETORS

The carburetor specification information for all models of Overland and Whippet equipped with Tillotson carburetors is arranged by carburetor model rather than by car model. To find the specification information for any particular model of Whippet or Overland, first determine the model of the carburetor by either referring to the table of Motor Specifications under Carburetor Adjustment or by examining the name plate of the carburetor. After the model of the carburetor is known, the specification information can be found in the following specification tables under the carburetor model heading.

Tillotson MS-1C

(Drill Specifications)

Description of part	Number of holes	Drill Size
Venturi Single 25/32"		
Main Nozzle (Upper Holes)	2	No 50
Main Nozzle (Lower Holes)	4	No 54
By-Pass Supply Hole (nearest flange)		No 70
By-Pass Supply Hole No 2		No 60
By-Pass Adjusting Hole		No 50
By-Pass Fuel Restriction Hole		No 43
Nozzle Fuel Restriction Hole		No 40

Tillotson R-1A

(Drill Specifications)

Description of part	Number of holes	Drill Size
Venturi Single 25/32"		
Nozzle Air Bleed (Upper Holes)	4	No 50
Fuel Adjusting Hole		No 55
Fuel Restriction Hole		No 66
By-Pass (Upper Hole)		No 70
By-Pass (Lower Hole)		No 55
By-Pass Fuel Restriction Hole		No 74

Tillotson S-4C

(Drill Specifications)

Description of part	Number of holes	Drill Size
Venturi Upper 13/16"		
Main Nozzle (Upper Holes)	2	No 60
Main Nozzle (Middle Hole)	1	No 65
Main Nozzle (Lower Holes)	2	No 65
Fuel Adjusting Hole		No 60
By-Pass (Upper Hole)		No 70
By-Pass (Lower Hole)		No 57
By-Pass Fuel Restriction Hole		No 70
By-Pass Air Bleed Hole		No 60
Outer Well Air Bleed Hole		5/32"
Inner Well Air Bleed Hole		No 36

Tillotson SP-16A

(Drill Specifications)

Description of part	Number of holes	Drill Size
Venturi Upper 15/16"		
Venturi Lower 5/16"		
Main Nozzle (Upper Hole)	1	No 70
Main Nozzle (Middle Holes)	2	No 70
Main Nozzle (Lower Hole)	1	No 68
Idle Fuel Supply Hole	1	No 66
By-Pass Upper Supply Hole		No 70
By-Pass Lower Supply Hole		No 55
By-Pass Air Adjusting Hole		No 42
By-Pass Air Bleed Hole		No 60
By-Pass Fuel Restriction Hole		No 70
Nozzle Fuel Adjusting Hole		No 56
Inner Well Air Bleed Hole		No 36

Tillotson SP-19A

(Drill Specifications)

Description of part	Number of holes	Drill Size
Venturi Upper 15/16"		
Venturi Lower 5/16"		
Main Nozzle (Upper Hole)	1	No 70
Main Nozzle (Middle Holes)	2	No 60
Main Nozzle (Lower Hole)	1	No 74
By-Pass Upper Supply Hole (in body casting)		No 70
By-Pass Lower Supply Hole (in body casting)		No 55
By-Pass Adjusting Hole		No 42
By-Pass Air Bleed Hole		No 65
By-Pass Fuel Restriction Hole		No 70
Fuel Adjusting Hole		No 56
Inner Well Air Bleed Hole		No 36
Idle Fuel Supply Hole		No 68

Tillotson SP-19C

(Drill Specifications)

Description of part	Number of holes	Drill Size
Venturi Upper 15/16"		
Venturi Lower 5/16"		
Main Nozzle (Upper Holes)	2	No 60
Main Nozzle (Middle Holes)	2	No 60
Main Nozzle (Lower Holes)	2	No 65
By Pass Upper Supply Hole		No 70
By-Pass Lower Supply Hole		No 56
By-Pass Air Adjusting Hole		No 42
By-Pass Air Bleed Hole		No 65
By-Pass Fuel Restriction Hole		No 74
Fuel Adjusting Hole		No 56
Inner Well Air Bleed Hole		No 36
Idle Fuel Supply Hole		No 70

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor

Car and Year	Model	Engine	No Cyl	Bore and Stroke	Carb Model and Size
OVERLAND					**TILLOTSON**
1925-26	91 92	Own	4	3½"x4 "	MS 1A, MS 1B MS 1C and MS-1E 1"
1925 26	93	Own	6	3 "x4 "	R 1A, R-1B 1"
WHIPPET					
1926 27 28	96	Own	4	3⅛"x4⅜"	S-4A S-4C 1"
1927 28	93A	Own	6	3 "x4 "	SP 16A SP-19B 1"
1928 29	96A	Own	4	3⅛"x4¾'	S-4A S-4D 1"
1928 29	98A	Own	6	3⅛"x3⅞"	SP 19B 1"
1930	96B	Own	4	3⅛"x4¾"	

ADJUSTMENT PRECAUTIONS

Economizer.—It is important on all Tillotson type carburetors equipped with sleeve type economizer to see that the economizer is properly adjusted If the economizer valve is open at low speed, motor performance will be affected in that it will be difficult to obtain a smooth idle or slow speed adjustment As shown in Fig 2, the economizer should be adjusted with a 1/64" to a 1/32" overlap in the closed position when the carburetor throttle valve is completely closed This adjustment can be obtained by loosening the set screw (A) and moving the control arm on the end of the economizer shaft

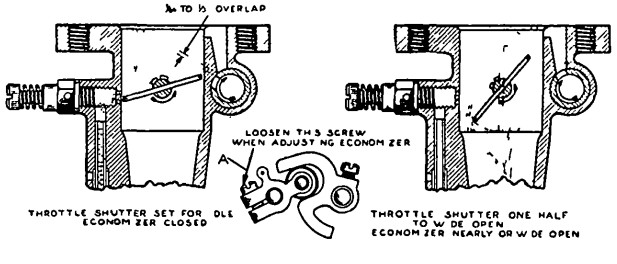

A TO 1/32 OVERLAP
LOOSEN THIS SCREW WHEN ADJUSTING ECONOMIZER
THROTTLE SHUTTER SET FOR IDLE ECONOMIZER CLOSED
THROTTLE SHUTTER ONE HALF TO WIDE OPEN ECONOMIZER NEARLY OR WIDE OPEN

Fig 2

Cross sectional view of upper half of carburetor throat showing location and adjustment of sleeve type economizer used on Tillotson carburetors The adjustment of the economizer is accomplished by means of the adjusting screw (A) It is important that the economizer be adjusted so that there is from 1/64" to 1/32" overlap when the throttle valve is closed as shown in the left hand view

If difficulty is experienced in obtaining an adjustment or if car performance does not seem to be correct after a proper adjustment of the economizer has been made, check to see that the economizer sleeve is not worn excessively. Also check to see that the throttle shaft is not badly worn. If the throttle shaft or economizer sleeve is worn to the point of where car performance is affected, replace with new parts.

Effect of Intake Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed for each movement of the gasoline adjusting needle at the bottom of the carburetor. This is necessary to allow time for the fuel that has accumulated in the manifold to pass into the motor. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this accumulation to pass into the motor, an accurate adjustment cannot be obtained.

Also be sure that the motor and manifolds are fairly warmed up before attempting a carburetor adjustment.

Adjustment for Gasoline Mileage.—If the car owner complains of low gasoline mileage, check to see that there are no gasoline leaks which would be indicated by a slow dripping or wet carburetor body. Jobs may be encountered where the float level adjustment is too high and the gasoline seeps out over the top of the main discharge nozzle.

Another cause for low gasoline mileage is a leak at the channel plugs or a loose main discharge jet.

The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

TILLOTSON MODEL MS

This carburetor is especially designed for the Overland engine. It is of the plain tube type with air-bled main nozzle accelerating well and by-pass for idling.

The upper cross-holes in the main nozzle bleed air above the level of gasoline and thin out the mixture at ordinary speeds to give maximum economy. The lower cross-holes fill the accelerating well and empty it when the throttle is opened quickly.

High Speed Adjustment.—The needle valve regulates the flow of fuel to the main nozzle. The approximate setting is two turns open. To adjust, open the throttle one-third on the quadrant or run the motor at a speed of approximately 20 to 25 miles per hour. Retard the spark and adjust the needle valve until the engine operates smoothly; then cut down ⅛ to ¼ turn which should give the best engine performance.

Idling Adjustment.—The by-pass needle regulates the air for idling. The approximate setting is one turn open. With the throttle closed, adjust the idling screw until the motor idles smoothly. If the motor idles too fast, adjust the throttle stop screw until the desired speed is obtained.

TILLOTSON MODEL R

In order to obtain an accurate and correct adjustment of a Tillotson carburetor, all units on the engine such as ignition points, spark plug points, motor compression, etc., should be in good condition. See that all special instructions given in the section following the motor tune-up have been checked; also refer to Adjustment Precautions above for special information regarding carburetor adjustment.

The Tillotson Model R carburetor used on Overland automobiles is of the non-air valve type having two adjustments; namely, the by-pass adjustment for idle and low speeds and the needle adjusting screw for medium and high speeds. The idle nozzle gets its fuel from the main nozzle, therefore the main nozzle should be adjusted first.

High Speed Adjustment.—Close the main adjusting screw (A) Fig. 3 to its seat (do not force against seat), then open two or three turns to the left or down; close the by-pass or idle adjustment screw (B) to its seat, then open to the left or out one turn. Start the motor and set the throttle on the steering column about one-third open or to a position where the motor will be running at approximately 30 miles per hour car speed and keep the throttle in this position until the adjustment is completed.

After the motor is thoroughly warmed up, retard the spark lever fully and with the motor running at the same speed, turn the high speed adjustment (A) slowly to the right or up until the engine slows down from a lean mixture. At this point, turn very slowly in the reverse direction (usually from ¼ to

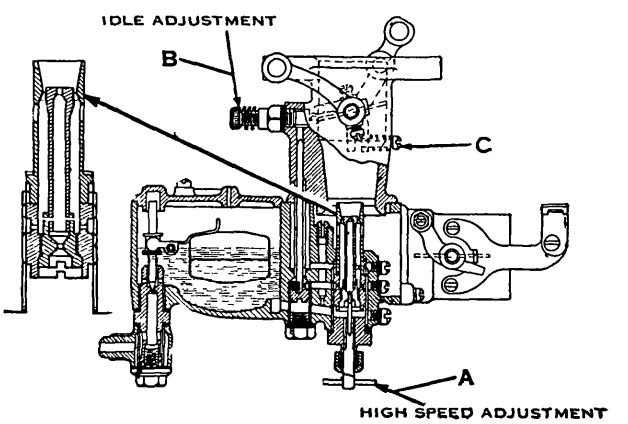


Fig. 3

Cross sectional view of Tillotson Model R carburetor used on Overland automobiles, showing enlarged section of the main discharge nozzle assembly.

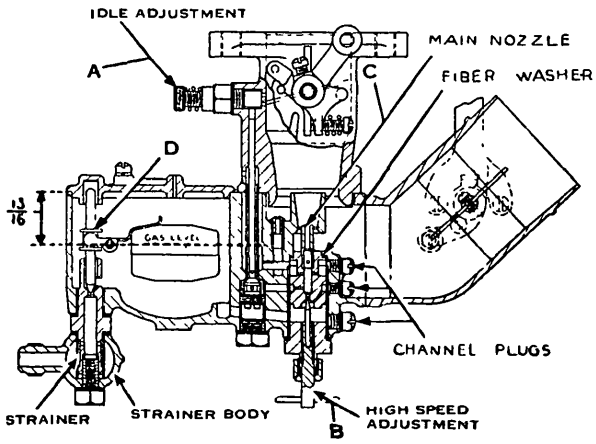


Fig. 4

Cross sectional view of Tillotson carburetor Model SP showing internal section and high and low speed adjustments.

⅜ of a turn) to that point where the motor runs at maximum speed. Do not open the high speed adjustment beyond the point of where the motor smooths out and runs at maximum speed since the most economical motor performance will be obtained with the needle valve in this position.

Low Speed Adjustment.—Close the throttle and make sure that the throttle stop screw does not allow the throttle to become fully closed. Then to get the proper idling mixture, turn the adjustment thumb screw (B) Fig 3 to the left or counter-clockwise admitting more air and making the mixture leaner. Continue to turn until the motor sputters or misses. At this point, turn slowly in the reverse direction to that position where the engine again fires evenly. After the idling mixture is correct which should be approximately one full turn from a fully seated position, adjust the throttle stop screw to the proper idling speed of the motor.

TILLOTSON MODEL S

The adjustment information for Tillotson Model S carburetors used on Whippet automobiles is the same as that for Model SP and will be found below under the heading Tillotson Model SP.

TILLOTSON MODEL SP

Before changing the carburetor adjustment, make sure that the trouble does not lie elsewhere. Examine the spark plugs and breaker points to see that they are correctly set and that the choke is in full open position. Also, refer to the tune-up precautions immediately following the tune-up operations and check all items that would affect the carburetor performance. Also read the adjustment precautions given above.

High Speed Adjustment.—Close the main adjusting needle (B) Fig. 4 by turning to the right or up until the needle is seated (never force tightly against its seat) then open by turning to the left or down two complete turns, close the by-pass or idle adjustment (A) until it is seated by turning to the right or in; then open by turning to the left or out one half turn. Thus adjusted, the engine should start and operate.

With the throttle partly open to an engine speed of approximately 25 miles per hour, allow the motor to warm up to normal driving temperature. After the motor has warmed up, retard the spark control level and gradually turn the main adjusting needle to the right or up to a point where the engine slows down from a lean mixture. When this point is reached, stop and gradually turn in the reverse direction until that position is found where the engine runs smoothly. This adjustment should be carefully made. Gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and run smoothly. Provision for maximum power is automatically supplied so that care should be exercised in adjusting the main adjusting needle (B) to provide for economical road performance. After the high speed adjustment is complete, next adjust the idling screw (A).

Idling Adjustment.—Turning the idle adjusting screw (A) Fig 4 to the right (clockwise) gives a richer mixture; turning it to the left (counter-clockwise) gives a leaner mixture. This adjustment is sensitive and should be made with care.

Close the throttle fully and with the spark retarded, set the throttle lever stop screw to run the engine at slightly faster speed than is desired for normal idling conditions. Turn the low speed adjusting needle (A) gradually to the left or out until a noticeable flutter or missing occurs. At this point, screw in the reverse direction to that position where the engine again fires evenly. Leave the adjustment at this position, that is delivering just as thin a mixture as will properly idle the engine. Next carefully adjust the throttle lever stop screw to operate the engine at the desired idling speed.

Accelerating Pump.—Sudden enrichment of the mixture is necessary to quick engine acceleration

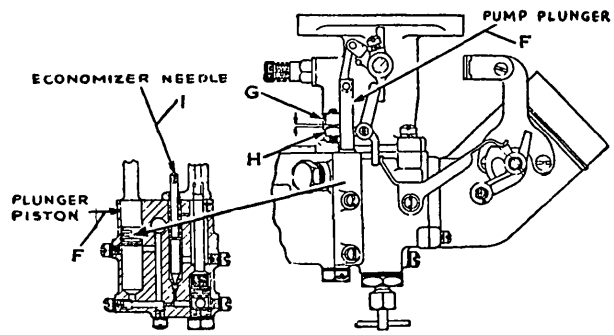


Fig 5

Sectional view with insert of Tillotson Model SP type of carburetor showing the accelerating pump (F) and economizer needle (I). The normal lift of the economizer needle is 1/16". This device enriches the mixture for starting and operating a cold engine. It also provides a richer mixture for power purposes. (See adjustment instructions under Dash Control).

and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is suddenly opened, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. (See Fig. 5). A given amount of fuel flows through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to proportions for maximum power.

While driving at normal speed with the throttle partly open, the mixture is regulated for maximum economy. When the throttle is opened wide, the carburetor delivers the proper mixture for maximum power.

Dash Control or Auxiliary Lift Needle.—In starting a cold engine, the carburetor dash control should be pulled out all the way and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control since this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that the choke lever is as far back as it will go with the control fully seated.

If for any reason it should become necessary to reset the metering pin lift, proceed as follows: With the throttle closed and the choke fully opened, there should be a minimum of .030″ to .040″ play between the adjustable nut (G) Fig. 5 and the fork (H) on the cross lever. There should always be sufficient play between the lever coupling, the choke cam and the needle lift lever to insure a seating of the needle. As shown in the illustration, the metering or economizer needle (I) also provides a richer mixture for power purposes at high speeds with the throttle opened. Thus it is important that the economizer needle adjustment be accurately made as described above.

TILLOTSON MODEL V

The Model V Tillotson is a plain tube expanding type of carburetor having fixed air passages while the fuel is automatically controlled in proportion. The carburetor is designed to give maximum power and economy with ordinary fuels. Before changing the carburetor adjustment, make sure that the trouble does not lie elsewhere. Check the spark plugs and breaker points to see that they are correctly set and that the choke is in full open position.

High Speed Adjustment.—If the carburetor has been dismantled for any purpose, adjust as follows: Close the high speed adjusting needle (A) Fig. 6 by turning to the right or down until the needle is seated (never force tightly against its seat). Then open by turning to the left or up three complete turns. Next close the by-pass or idling adjustment (B) until it is seated by turning to the right or in. Then open by turning to the left or out three-quarters to one full turn, thus adjusted, the engine should start and operate.

Retard the spark control lever fully; with the engine running approximately 25 miles per hour car speed, gradually turn the main adjusting needle (A) to the right or up to a point where the engine slows down for want of fuel. When this point is reached, stop and gradually turn in the reverse direction until that position is found where the engine runs free. This adjustment should be carefully made for gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and smooth running. Provision for maximum power is automatically supplied through the accelerating pump and needle lift so in adjusting, set the main adjustment to provide for economical road performance.

Idle Adjustment.—Close the throttle and with the spark control lever retarded, set the throttle lever stop screw to run the engine faster than is desired for normal idling speed. Next turn the idle adjustment (B) Fig. 6 gradually to the left or out thinning the mixture until a noticeable flutter or missing occurs. At this point, turn the screw in the reverse direction only to that position where the engine again runs smoothly. Leave the adjustment at this position delivering just as thin a mixture as will properly idle the engine and carefully adjust the throttle lever stop screw to operate the engine at the desired idling speed.

In operation, the carburetor is fully automatic except that at partial choke position as controlled through the manual choke control on the dash, fuel metering is governed by the usual high and low speed adjusting needles.

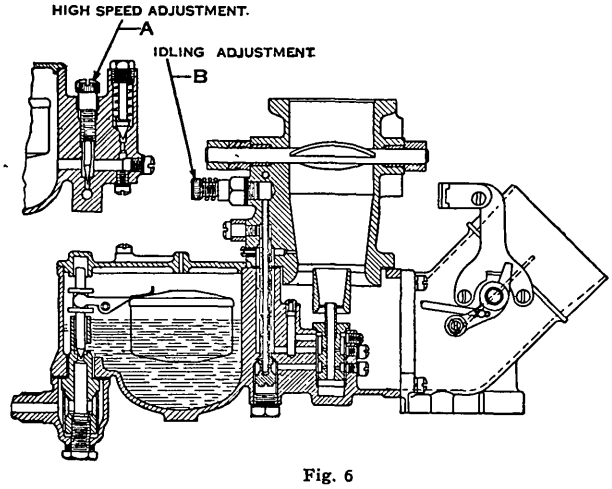


Fig. 6

Cross sectional view of Tillotson Model V carburetor showing a cross section view of the high speed adjustment (A). Model V carburetors are different from the SP type in that the high speed adjustment is mounted behind the bowl as shown, while on the SP type the high speed adjustment is located at the bottom of the carburetor.

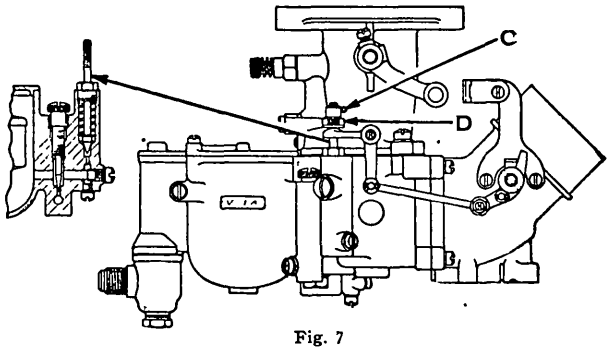


Fig. 7

View of Tillotson Model V carburetor showing a sectional view of the high speed adjustment and auxiliary starting needle. The lift of the auxiliary needle can be regulated by the nut (D).

Lift or Metering Needle Setting.—The metering or economizer needle is affected by the dash control when starting and by the throttle lever at high speeds. In starting a cold engine, the carburetor dash control should be pulled out all the way and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control since this is likely to cause crankcase dilution. Do not use the dash control when the engine is warm. If it should become necessary to adjust the dash control to the carburetor, see that the choke lever is as far back as it will go with the control fully seated.

If it should become necessary to reset the lift needle, proceed as follows: With the throttle closed and the choke fully opened, there should be a minimum of from .030″ to .040″ play between the adjustable nut (C) Fig. 7 on the needle and the fork (D) on the cross lever. There should always be sufficient play between the lever coupling the choke cam and the needle cam lift lever to insure the seating of this needle.

Packard 1925-30

Motor Tune-Up

When tuning a Packard motor, extreme care should be exercised to see that the ignition and valve timing are correct, that the motor has good compression, on models equipped with distributors having double breaker arms, that both sets of arms are properly and correctly synchronized, that the spark plug gaps are correctly adjusted as given in the Ignition Timing Table in the Ignition Timing section and that the contact points are correctly spaced and in good condition.

Immediately following the Tune-Up Operations will be found special information which should be closely observed if trouble is experienced.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: Timing chain adjustment should be made with the motor hot.
3. Synchronize distributor points.
4. Check ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
6. Check gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan belt; adjust if necessary.
   Note: A loose fan belt will cause a squealing noise at high speeds.
8. Tighten water pump packing gland nut; this operation is only necessary when packing gland is leaking.
9. Check throttle valve for opening.
10. Check choke valve for position.
11. Check manifold gaskets; see that all manifold flange nuts are tight.
12. Adjust carburetor.
13. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Spark Plug Gap Clearance.—On all Models of Packard cars, care should be exercised when adjusting the spark plug gap clearance to see that the gaps are not too wide or too close together. If trouble is experienced, set the spark plug gaps at .022". (See Ignition Timing Table for spark plug gap clearance).

Cracked Fuelizer Body.—On all Models of Packard equipped with carburetors having a fuelizer unit, a poor idling condition may be caused by a cracked fuelizer body.

A cracked fuelizer body is most generally the result of someone unfamiliar with Packard carburetors tightening the fuelizer cover bolts unevenly. The crack will most generally occur on the under side of the body.

To correct this trouble, either replace the fuelizer body or weld the crack. If the crack is welded up, it will be necessary to reface the fuelizer body flange.

Contact Points Improperly Synchronized.—Of all the motor tune-up operations for Packard, the most critical is ignition timing, spark plug and contact point setting. Those models equipped with distributors having double breaker arms should be carefully and accurately synchronized. If the points are not properly synchronized, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds.

To correct this condition, synchronize the distributor points as explained in the Ignition Timing section.

Air Valve Sticking.—On all Models of Packard equipped with Packard carburetors, a poor idling condition may be the result of an air valve stem sticking in the guide.

To correct this trouble, remove the air valve spring cover and oil the air valve stem.

Weak Air Valve Spring.—On all Models of Packard equipped with Johnson carburetors, a poor idling condition may be caused by a weak or defective air valve spring.

To correct this trouble, replace the old air valve spring with a new part.

Poor Acceleration

Poor acceleration on all Models of Packard and especially eight cylinder models will most generally be caused by improper ignition timing, spark plug point setting or improperly synchronized distributor points. (See information covering these units in the section for Ragged Idle).

Carburetor.—A condition of poor acceleration may be caused by improper carburetor adjustment. See that the carburetor air valve springs are in good condition and that the air valve adjustment is accurately made. (See Carburetor Adjustment section).

Low Gasoline Mileage

Gasoline Logged Float.—Low gasoline mileage may be due to a high float level as the result of a float that is soaked with gasoline. To correct this trouble, replace the old float with a new one.

Incorrect Fuelizer Adjustment.—Low gasoline mileage on models equipped with carburetors having a fuelizer may be caused by an improper setting of the air adjustment. Adjust the fuelizer air screw until a bright green light can be seen through the fuelizer glass.

Popping In Carburetor

Spark Plug Gap Adjustment.—A condition of popping back through the carburetor which may be confused with a stuck valve may be caused by spark plug gaps that are too wide (See Ignition Timing Table for Spark Plug Gap Clearance).

Hard Starting

Fuelizer Jets Plugged Up.—A condition of hard starting may be caused by the three fuelizer jets leading from the fuelizer chamber to the intake manifold being plugged up with carbon When these fuelizer jets are plugged up, the fuelizer will not burn.

To correct this trouble, remove the carburetor from the manifold and clean the fuelizer jets with a wire drill. Care should be exercised when cleaning these jets not to damage or enlarge the openings.

Motor Noise

Loose Fan Belt.—A squealing noise at high speeds may be caused by the fan belt slipping as the result of looseness To correct this trouble tighten up the fan belt.

OIL PRESSURE

Model and year	Min	Max
326, 333—1925-26	2 lbs at 5 M P H	20 to 35 lbs at 25 M P H
236, 243—1925-26	2 lbs at 5 M P H	40 to 45 lbs at 25 M P H
426, 433—1927	2 lbs at 5 M P H	20 to 35 lbs at 25 M P H
336, 343—1927	2 lbs at 5 M P H	25 to 40 lbs at 25 M P H
526, 533—1928	23 lbs at 10 M P H	
443—1928	42 lbs at 12 M P H	
640, 645, 626, 633—1929	2 lbs at 5 M P H	25 to 40 lbs at 25 M P H
726, 733, 740, 745—1930	2 lbs at 5 M P H	25 to 40 lbs at 25 M P H

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing data for all models of Packard from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
PACKARD						
1925-26	326, 333	.020″-.025″	1 1/16″B	Adv	.022″-.025″	1-5-3-6-2-4
1925-26	236, 243	† .015″-.020″	1 5/8″B	Adv	.022″-.025″	1-3-2-5-8-6-7-4
1927	426, 433	† .020″-.025″	3/4″B	Adv	.022″	1-5-3-6-2-4
1927	336, 343	† .020″-.025″	3/4″B	Adv	.022″	1-6-2-5-8-3-7-4
1928	526, 533	† .018″-.022″	3/4″B	Adv	.022″	1-5-3-6-2-4
1928-29	443, 640, 645	† .018″-.022″	3/4″B	Adv	.022″	1-6-2-5-8-3-7-4
1929	626, 633	† .018″-.022″	*3/4″B	Adv	.022″	1-6-2-5-8-3-7-4
1930	726, 733	† .018″-.022″	*3/4″B	Adv	.022″	1-6-2-5-8-3-7-4
1930	740, 745	† .018″-.022″	*3/4″B	Adv	.022″	1-6-2-5-8-3-7-4

Adv —Spark lever in full advance position B —Before top dead center

*The pointer for valve and ignition timing by flywheel marks is located in starting motor hole in flywheel housing Remove starter motor to check timing by flywheel marks.

†Contact points must be synchronized See special information, Synchronizing Distributor Points

Packard Models 326, 333 1925-26.—The contact points should just start to separate when piston No. 1 is 1 9/16″ (flywheel travel) before top dead center of the compression stroke. The spark lever should be set in the full advanced position. (See Ignition Timing Table for contact point gap clearance).

Packard Models 236, 243 1925-26.—The contact points should just start to separate when piston No. 1 is 1⅝″ (flywheel travel) before top dead center of the compression stroke. The spark lever should be set in the fully advanced position. (See Ignition Timing Table for contact point gap clearance).

The distributors used on these models have two breaker arms and an eight lobe cam. The contact points open simultaneously. For complete synchronizing procedure see information under heading To Synchronize Eight Cylinder Distributors With Eight Lobe Cam

Packard Models 336, 343, 426, 433 1927, 526, 533 1928, 443, 640, 645 1928-29, 626, 633 1929.—The contact points should just start to separate when piston No. 1 is 21/32″ (flywheel travel) before top dead center of the compression stroke. The spark lever should be set in the fully advanced position. (See Ignition Timing Table for contact point gap clearance). Synchronizing information for those models equipped with double breaker arms will be found below.

Packard Models 726, 733, 740, 745 1930.—The contact points should just start to separate when piston No. 1 is 29/32″ (flywheel travel) before top dead center of the compression stroke The spark lever should be set in the fully advanced position. (See Ignition Timing Table for contact point gap clearance). Synchronizing information for those models equipped with double breaker arms will be found below.

To Synchronize Eight Cylinder Delco Distributors With Eight Lobe Cam (contact points open simultaneously) —Connect a test lamp across each set of contact points and adjust both sets of points to open exactly at the same time as indicated by both lamps going out at the same instant.

To Synchronize Six Cylinder Delco-Remy Distributors With Three Lobe Cam (1 ignition coil). —This distributor has a three lobe cam and two sets of contact points. One set is mounted on a stationary base and the other set is mounted on a movable base and the points are arranged to break 45° apart distributor shaft rotation which is equivalent to 90° of flywheel travel

Adjust each set of contact points for correct opening as given in the ignition timing table. Use synchronizing tool No. 820751, Fig. 1, which can be obtained at any United Motor Service Branch or authorized Delco-Remy service station. Rotate the distributor shaft in the direction of rotation until the contact points on the stationary plate just open. The instant the contact points open can be determined by the use of a test ammeter or test

lamp connected in series with the primary circuit. With the ignition switch turned on, the instant the contact points open the ammeter needle will drop back to zero if a test ammeter is used or the light will go out if a test lamp is used.

Hold the distributor shaft exactly in this position and place the synchronizing tool on the shaft in place of the rotor with the spring nearest the arrow on the tool which indicates the direction of rotation in the notch on the shaft. Scratch a mark on the side of the distributor housing in line with the zero graduation of the scale of the tool on the side of the arrow which indicates the direction of distributor shaft rotation. Rotate the distributor shaft in the direction of rotation without removing the tool until the zero graduation on the opposite side of the tool is even with the first mark made on the distributor housing.

Hold the distributor exactly in this position and adjust the movable plate by loosening the screws over the plate and turning the eccentric screw until the contact points just open.

Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy.

To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (1 ignition coil).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate. The points are arranged to break 45° apart of distributor shaft rotation which is equal to 90° of flywheel travel. Adjust each set of contact points to the correct clearance as given in the Ignition Timing Table. Use synchronizing tool No. 822572, Fig. 2, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

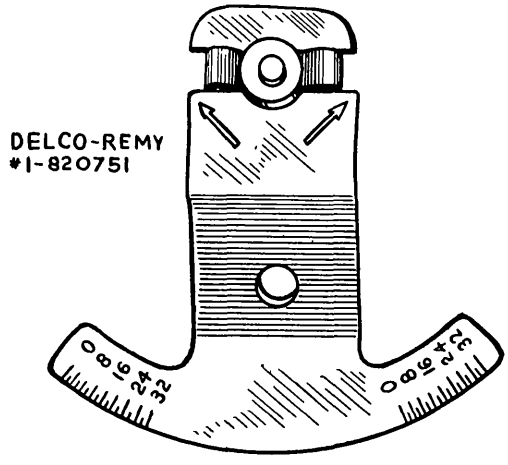


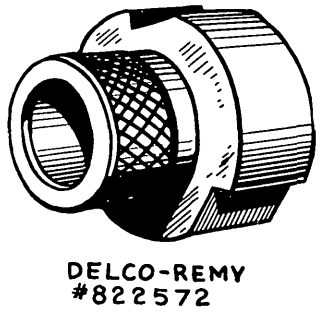
Fig. 1

Delco-Remy synchronizing tool No. 820751 used to synchronize Packard distributors. The distributor points are set 45° apart of distributor shaft rotation which is equal to 90° of flywheel travel.

The cam must be removed in order to use the synchronizing tool and much time can be saved in retiming the distributor to the motor if the position of the rotor is marked before removing the cam.

Fig. 2

Delco-Remy synchronizing tool No. 822572 used to synchronize distributors used on Packard automobiles. The distributor points should break 45° apart of distributor shaft rotation, which is equal to 90° of flywheel travel.



Turn the rotor against rotation with the fingers to take up backlash in the gears and mark the position of the rotor with corresponding marks on the side of the distributor housing and remove the rotor. Loosen the lock screw in the center of the cam and remove the cam. Place the synchronizing tool on the rotor shaft in place of the cam and rotate the tool with the fingers or pliers until the contact rubbing blocks drop into the notches in the sides of the tool.

Loosen the lock screws which hold the movable plate and adjust this plate by turning the eccentric screw with a screwdriver until both sets of contact rubbing blocks fit evenly against the flat sides of the notches in the synchronizing tool.

On earlier production which does not have adjustable plates and eccentric screw, the entire contact point plate must be moved until both rubbing blocks fit evenly against the sides of the notches in the tool.

Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy.

Replace the cam and rotor and turn the rotor until the scratch mark is even with the mark on the distributor housing. Remove the rotor and tighten the lock screw in the center of the cam and check the scratch mark again, making sure that the rotor is turned against rotation to take up backlash.

To Synchronize Eight Cylinder North East Distributors With Eight Lobe Cam (points open simultaneously).—Connect a test lamp across each set of points and adjust the points to open exactly at the same instant which will be indicated by both lamps going out simultaneously.

VALVE TIMING

Packard All 6 and 8 Cylinder Models 1925-29.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .004". The intake valve should just start to open when piston No. 1 is at top dead center of the exhaust stroke. (See Valve Timing Table for valve tappet clearances).

Packard Models 726, 733, 740, 745 1930.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .004". The intake valve should

Valve Timing Table

The following table contains complete valve timing data for all models of Packard from 1925 to 1930 inclusive. The valve tappet clearances are for hot motor.

Year	Model	Tappet Adjustment				Valve Timing		
		For Timing		Running		Piston Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
PACKARD								
1925-26	326, 333	004″		004″	004″	T C	Opens	
1925-26	236, 243	004″		004″	004″	T C	Opens	
1927	426, 433	004″		004″	004″	T C	Opens	
1927	336, 343	004″		004″	004″	T C	Opens	
1928	526, 533	004″		004″	004″	*T C	Opens	
1928-29	443, 640, 645	004″		004″	004″	*T C	Opens	
1929	626, 633	004″		004″	004″	*T C	Opens	
1930	726, 733	004″		004″	004″	*1/32″B	Opens	
1930	740, 745	004″		004″	004″	*1/32″B	Opens	

B —Before top dead center T C —Top dead center
*Pointer for valve and ignition timing by flywheel marks is located in starter motor hole in flywheel housing Remove starter motor to check timing by flywheel marks

just start to open when piston No. 1 is 5/32″ (piston travel) before top dead center of the exhaust stroke. (See Valve Timing Table for valve tappet clearance).

TIMING CHAIN ADJUSTMENT

Packard all Models 1925-30 are equipped with a triangular drive chain for which a manual adjustment is provided. To check the timing chain for slack, remove the inspection hole plug which is located above the chain at the right forward end of the crankcase. If a combined inward and outward deflection of the chain at the inspection hole is ½″ or more, the chain should be readjusted.

To adjust the chain, loosen the three nuts on the generator flange stud and pivot the generator on the lower stud. With the motor running, move the generator away from the motor until a slight humming noise develops and then move the generator back toward the motor to the point of where this noise just disappears. Tighten the three nuts, recheck the deflection of the chain which should be not less than ⅛″ and not more than ¼″.

GAS LINE SCREENS

All Models of Packard equipped with vacuum tank fuel feed have two gas line screens in the gasoline system from the supply tank to the carburetor. One screen is located in the top of the vacuum tank and the other screen is located at the carburetor. Some models equipped with vacuum tank fuel feed are provided with a sediment bowl located between the vacuum tank and the carburetor. This sediment bowl also has a filter which should be cleaned at regular intervals.

All Models of Packard equipped with fuel pump fuel feed have two gas line screens between the supply tank and the carburetor. One screen is located in the fuel pump and the other is located at the carburetor. To clean the gas line screen in the top of the fuel pump bowl, remove the bowl and wash the screen in clean gasoline. When replacing the fuel pump bowl, care should be exercised to see that the gasket between the top of the fuel pump bowl and the fuel pump body is in good condition and does not leak.

Carburetor Specifications

FLOAT LEVEL

Johnson Model R.—The fuel in the carburetor bowl will stand at the correct level when the lower face of the float is 1¼″ below the machined flange or gasket face of the carburetor body or diaphragm, with the float bowl gasket removed. This dimension should be uniform for the entire circumference of the float and should be taken with the carburetor held in an inverted position or with the float valve in a seated position.

To adjust the float level, bend the brass float support up or down until the desired measurement is obtained.

Packard Carburetors, All Models.—The level of the fuel in the float bowl of all models of Packard carburetors will be correct when the distance from the pointed tip of the float valve needle to the lower surface of the spool bushing on the needle measures 2 3/16″ as shown in Fig. 3. In order to take this measurement, it will be necessary to remove the float needle from the carburetor bowl.

If it should be necessary to adjust the float level, remove the needle valve from the carburetor and heat the spool bushing sufficiently to melt the solder enough to permit of moving the bushing on the needle; then by lightly tapping the bushing, being careful not to damage either the bushing or the needle, move the bushing to the desired position which will be exactly 2 3/16″ measured from the pointed end of the needle to the lower face of the bushing as shown in Fig. 3.

CARBURETOR SPECIFICATION DIAGNOSIS

The following paragraphs contain carburetor specification information for Detroit Lubricator, Johnson and Packard carburetors used on Packard automobiles. The information is arranged under the carburetor heading.

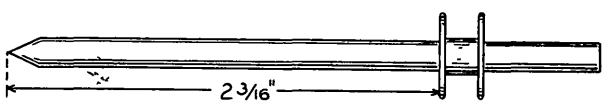


Fig. 3

Float valve needle and spool bushing used in Packard air valve carburetors. The float measurement should be taken from the pointed end of the needle to the lower surface of the spool bushing as indicated.

DETROIT LUBRICATOR CARBURETORS

Detroit Lubricator carburetors are used as equipment on late Model Packard automobiles. These carburetors are of the expanding principle.

All jets and passageways are of the fixed size and properly set to give maximum efficiency through the full range of the carburetor. The amount of gasoline fed into the mixture is controlled by the gasoline adjusting needle extending into the lower end of the aspirating tube. This needle is tapered, thus the correct amount of gasoline for a given amount of air is accurately metered by the movement of the aspirating valve assembly up or down on the tapered metering needle.

The carburetor being automatic in its action and properly adjusted at the factory, very little trouble will be experienced other than improper carburetor adjustment and dirt. If a correct adjustment cannot be obtained, remove the carburetor from the intake manifold and wash all jets and passageways in clean gasoline.

Caution: Extreme care should be exercised when reassembling the carburetor to see that the hinge on which the vanes operate is not pinched in such a manner that proper movement is prevented when the members of the carburetor body are bolted together.

Complete information on the theory of operation and adjustment of Detroit Lubricator carburetors as used on Packard automobiles will be found in the Carburetor Adjustment section under the heading Detroit Lubricator Carburetors.

JOHNSON CARBURETORS

Johnson Model R carburetors used on Packard automobiles are of the plain air valve type provided with an economizer, accelerating pump and an interconnected throttle and choke. The fuel mixture is controlled chiefly by the action of an automatic air valve which takes care of the carburetor through its full range of operation. Each carburetor is correctly calibrated at the factory, therefore the jet specification information consists chiefly of inspecting the carburetor for dirty or plugged up passageways and openings and worn parts.

Occasionally, jobs will be encountered where someone unfamiliar with Johnson carburetors has tampered with the calibration specifications by drilling out the economizer tube or by changing or stretching the air valve spring. Under no consideration should these parts be changed or tampered with in any way.

Inspection Instructions

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, thoroughly wash in clean gasoline and inspect as follows:

Warped Parts.—Inspect the milled surfaces of the upper and lower body flanges where the two halves of the body are bolted together to see that these flanges are not warped or distorted in any way.

If the upper body flanges are warped, it may distort the air valve seat causing a leak at the carburetor air valve and thus throwing the carburetor adjustment out of balance.

Warped or distorted body flanges may be checked out by the use of a feeler gauge inserted between the upper and lower halves of the body before the carburetor is dismantled or by using a straightedge on the base of the flange after the lower half of the body has been removed. To correct this trouble, replace the carburetor body.

Air Valve Spring.—The air valve spring (C) Fig. 6 is a calibrated part and should not be stretched or tampered with in any way. Weak air valve springs will be most noticeable at high speeds causing a lean mixture. If when the carburetor is overhauled or dismantled for cleaning there is any doubt as to the condition of the air valve spring, it should be replaced with a new part. Air valve springs should have a free length of approximately 1½" to 1 9/16".

Economizer Tube.—The purpose of the economizer tube is to admit an air stream into the middle of the gasoline flow for economy. The economizer tube (D) Fig 6 conducts air into a drilled passage leading to the chamber lying between the spray needle seat and the main discharge jet. At this point the air is mixed with gasoline flowing upward through the jet. The economizer is opened at idle and all throttle positions and car speeds up to approximately 55 miles per hour. As the engine speed increases, the rate of air flow increases more rapidly than does the rate of gasoline flow gradually bringing about a leaner condition requiring that the air leaks through the economizer be stopped, thus transferring the vacuum directly to the high speed spray jets for open throttle conditions. At higher speeds or when additional power is required at low speeds, the opening motion of the throttle lever produces a rotation of the throttle valve cross shaft and causes the economizer lever and cap assembly (E) floating on this shaft to rotate by means of a coiled spring, to a position such that the cap closes the opening in the upper end of the economizer tube. Additional opening of the throttle does not further affect the action of the economizer.

Jobs may be encountered where someone unfamiliar with Johnson carburetors has drilled out the economizer tube opening which is a calibrated part. On the base of each economizer tube, stamped on the hexagon nut portion, a number will be found which corresponds to the wire drill size of the tube. If trouble is experienced with the motor loading or difficulty is encountered when attempting an adjustment, check to see that the opening in the economizer tube corresponds with the drill size stamped on the base of the tube.

Air Valve.—The air valve (F) Fig. 6 should be inspected for wear and loose hinges. When the motor is not running, the air valve is closed but when the motor is in operation, the air valve is continually off its seat and operates automatically to supply the requirements of the engine. If the hinges are excessively worn or loose, the air valve may not operate correctly and thus upsets the balance of the carburetor.

Stabilizer Piston.—The automatic air valve is stabilized by a dash pot consisting of a brass piston (G) Fig. 6 operating in a well of gasoline. The piston is connected to the air valve by a plunger rod (H). The lower end of the stabilizer well is closed and the well is kept filled with gasoline by a drilled hole leading from the float chamber. The piston fits loosely in the dash pot and permits gasoline to flow slowly from above the plate (G) to below and vice versa. A flat brass washer and a cup shaped brass washer, between which is a felt washer, fits loosely around the plunger rod at the top of the dash pot. The action of the piston in the gasoline filled well provides a retarding force preventing fluttering of the air valve particularly on open throttle and low speeds.

When the carburetor is dismantled for any purpose, the stabilizer piston assembly and washer should be inspected to see that they are in good condition.

Accelerating Pump.—The accelerating pump (M) Fig. 6 is an integral part of the carburetor and is located on the side of the carburetor body. The pump is in effect a single acting air pump in which a leather piston expanded by a coil spring and supported by suitable washers is actuated by a plunger rod connected to a lever mounted on the throttle valve cross shaft. The piston slides in the cylinder which is opened to the atmosphere at the top and connected to an air passage leading into the upper part of the float chamber bowl.

Air is forced on the down stroke of the pump into the air space at the top of the float chamber. Under normal conditions, the pressure on the gasoline in the float bowl is atmospheric due to the leakage of air through the air bleed. This pressure is increased temporarily whenever the plunger in the pump is quickly forced down by quickly opening the throttle. The action of the increased pressure in the float chamber causes a sudden increase of the rate at which the gasoline is forced to the nozzle slightly ahead of the air stream through the automatic air valve. When the throttle is opened slowly, the air in the pump is forced out through the air bleed instead of into the float chamber so that the accelerating pump does not have an effect upon the mixture.

On Model R Johnson carburetors used on Packard, a thermostat control (N) Fig. 6 is used to regulate the action of the accelerating pump according to temperature conditions. This device provides a hole leading out of the lower end of the accelerating pump chamber bleeding the air which otherwise would be forced into the float chamber. This hole is automatically opened and closed by a felt but attached to the lower end on a thermostatically controlled arm. The action is such that the button uncovers the hole as the operating temperature rises and closes it when the temperature is low.

If trouble is experienced on acceleration, check to see that the accelerating pump thermostat is working correctly. If the thermostat is found to be defective, replace with a new unit.

PACKARD CARBURETORS

All models of Packard carburetors used on Packard automobiles are of the air valve type. The action of the carburetor for both high and low speeds is controlled by two air valve springs. The outer air valve spring, Fig. 9, controls the action of the air valve at low speeds and the inner spring controls the action of the air valve at high speeds.

Very little trouble will be experienced with these carburetors unless someone unfamiliar with Packard carburetors has tampered with the air valve springs by either stretching the springs or tampering with the adjusting nuts on the air valve stem.

Complete adjustment information will be found in the Carburetor Adjustment section under the heading of Packard Carburetors. If trouble is experienced after a correct adjustment has been made, check to see that all jets and passageways are clean and free of dirt. Also check to see that someone has not tampered with the air valve springs by stretching them or replacing a spring with one of improper dimensions.

Air Valve Springs

Air valve springs used in Packard carburetors are calibrated parts. The inner spring is the high speed spring and should have a free length of approximately 2 1/16" to 2⅛". The outside spring is the low speed spring and should have a free length of approximately 3 3/16". If these springs vary much from the above dimensions, replace with new springs.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
PACKARD					JOHNSON
1929	626, 633	Own	8	3 1/16"x5"	"
1930	640, 645	Own	8	3½"x5"	"
					PACKARD
1925-26	326, 333	Own	6	3½"x5"	Own
1925-26	236, 243	Own	8	3⅜"x5"	Own
1927	426, 433	Own	6	3½"x5"	Own
1927	336, 343	Own	8	3½"x5"	Own
1928	526, 533	Own	6	3½"x5"	Own
1928-29	443, 640, 645	Own	8	3½"x5"	Own
1930	726, 733	Own	8	3 1/16"x5"	Detroit Lub.
1930	740, 745	Own	8	3½"x5"	Detroit Lub.

Complete adjustment information for all carburetors used on Packard automobiles will be found in the following paragraphs.

If trouble is experienced in obtaining a correct carburetor adjustment, after all tune-up recommendations have been checked, turn to the Carburetor Specification Diagnosis section for more information.

DETROIT LUBRICATOR CARBURETORS

Principle of Operation

Detroit Lubricator carburetors come as equipment on 1930 Packard automobiles. This carburetor operates on what is usually termed the expanding principle. Air enters the air intake and passes up between the vanes (C) Fig. 4 and mixes with the gasoline which is discharged from the jets (B). The vanes move from a nearly closed position at idle to wide open as the speed increases. As the vanes open, the gasoline metering orifice is raised on the metering pin (P) and since the metering pin is tapered, the orifice is enlarged as the vanes open.

Economizer.—For maximum power at any speed, additional fuel is required which must be added to the part throttle mixture for wide open throttle performance. As the extra fuel is not used on part throttle operation, a leaner mixture is obtained when the power is not in demand. This provides an economizer action. To secure this action when the throttle is opened more than one-half way, the pump plunger which is directly connected to the throttle by means of a rack and pinion (G)

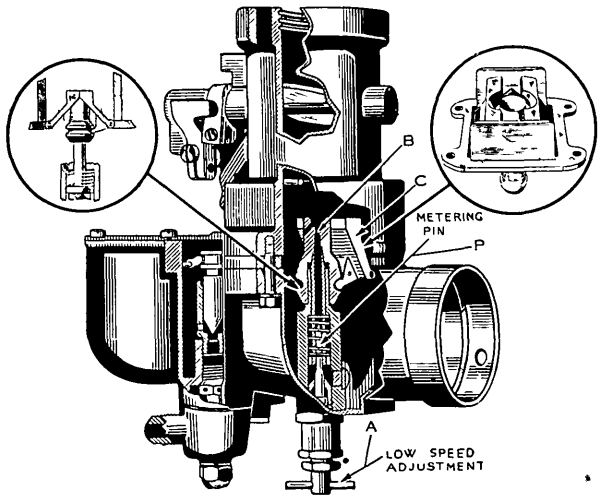


Fig. 4

Cutaway sectional view of Detroit Lubricator carburetor used on late Model Packard This carburetor is of the expanding type and has one adjustment as shown at (A). For complete description see Principle of Operation in Carburetor Adjustment section under the heading Detroit Lubricator Carburetors.

Fig. 5, closes the air bleed hole (H) and the power well begins to flow at (K), making the mixture richer. The power well and accelerating pump are fed from the jet (N).

Accelerating Pump.—For a quick opening of the throttle at any speed, it is necessary to provide a richer mixture of gasoline and air to give fast and uniform acceleration. This is accomplished by an accelerating pump (L) Fig. 5 on the lower end of the plunger which is connected to the throttle by the rack and pinion (G). As the throttle is opened, the plunger in the pump displaces the fuel in the pump chamber and the accelerating fuel is discharged in the air stream at (K). The check valve assembly in the bottom of the pump prevents fuel from being forced back into the float chamber instead of into the air stream.

The presence of dirt or grit on this valve seat may cause leaks, reducing the accelerating charge so that a lean spot (flat spot or bump) may result when the throttle is opened quickly. This may be easily remedied by removing the check valve assembly and blowing it out with compressed air.

For starting in cold weather, the carburetor choke control lever is pulled around to the extreme position. This will permit the primer opening in the pump housing to register with the primer opening in the throttle body. When the engine is cranked, gasoline is drawn in above the throttle plate, on the high vacuum side of the throttle and from there into the manifold.

Automatic Throttle Control.—An automatic throttle control for starting is provided. This is accomplished by a throttle kicker screw located in the gear of the throttle shaft, riding on a flat on the pump housing. This flat when rotated by movement of the carburetor choke control lever, provides a cam action which opens the throttle the required amount. The throttle kicker screw should be set approximately flush or so that it just contacts with the flat on the pump housing. This eliminates any necessity of opening the throttle when starting by means of a throttle control hand lever at the steering wheel.

Carburetor Adjustment

If it should be necessary to readjust the carburetor for any reason, start the engine and allow it to warm up to normal running temperature. With the spark retarded and the throttle closed, loosen the clamp screw holding the throttle stop screw and move the throttle adjusting screw in to increase the speed and out to reduce the engine speed until the engine will idle at approximately 5 miles per hour road speed.

Turn the metering pin (A) Fig. 4 or 5 in until the engine begins to miss from a lean mixture, then turn slowly to the left or out until the engine fires evenly on all cylinders. This is the only adjustment on the carburetor and regulates the gasoline air ratio throughout the entire range. When the idle adjustment is properly set, the carburetor is set for maximum performance of the engine.

JOHNSON MODEL R

Johnson Model R carburetors used on Packard are of the plain air valve type provided with an economizer, accelerating well and an interconnected throttle and choke The fuel mixture is controlled chiefly by the action of an automatic air valve which takes care of the carburetor through its full range of operation.

High Speed Adjustment.—After the motor has been thoroughly warmed up, set the hand throttle so that the motor is running at approximately 30

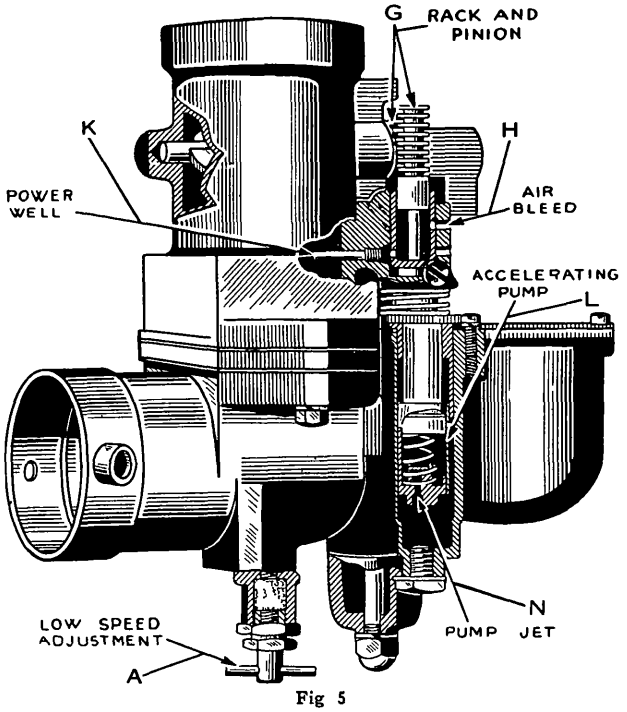


Fig 5

Cutaway sectional view of Detroit Lubricator carburetor used on late Model Packard showing the accelerating pump and power well.

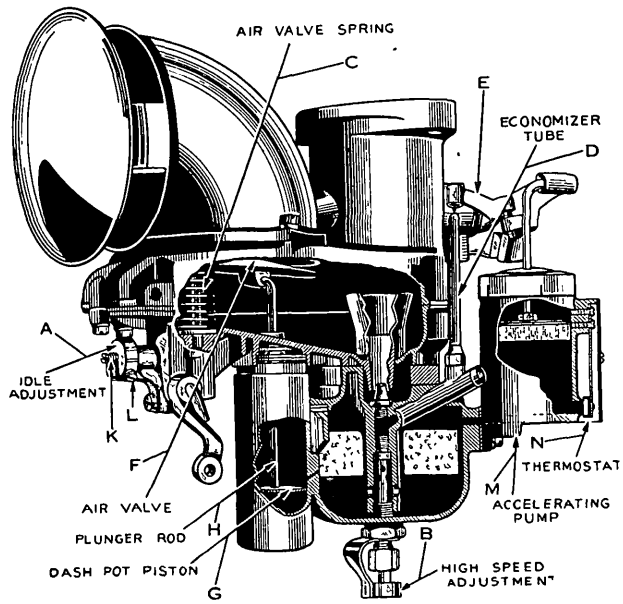


Fig. 6

Cross sectional view of Johnson carburetor used as equipment on Packard automobiles. This is an air valve carburetor having two adjustments, the idle adjustment which controls the action of the air valve and the high speed adjustment which controls the flow of gasoline. The output of the accelerating pump is controlled by means of a thermostat.

miles per hour. Screw in the high speed adjustment (B) Fig. 6 until the motor runs rough from a lean mixture and then back off the adjustment until the motor just smooths out.

Another very effective method of making a high speed adjustment is to screw in the high speed adjusting screw to its seat, exercising care not to damage the screw by screwing it up too tight, then back the adjusting screw out just six notches. This will be found to be approximately the correct adjustment for all Models of Packard equipped with Johnson carburetors. Then take the car out on the road and road test to see that the car performance is correct.

Idle Adjustment.—After the high speed adjustment operation has been completed, slow the motor down to idling speed and set the air valve screw for best performance.

It is very important when making an idle adjustment to allow from 10 to 15 seconds time between each movement of the adjusting screw for the fuel that has accumulated in the manifold to pass into the motor. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for the fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. A condition of insufficient time allowance between each movement of the adjusting screw will generally be indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

To make the idle adjustment use a screwdriver, loosen the screw (L) Fig. 6 so that the adjusting screw (K) can be moved freely in the knurled adjusting screw sleeve. Then with a screwdriver inserted in the slot of the screw (K) turn the screw in a counter-clockwise direction or out until the motor slows down from a lean mixture. Then screw the screw (K) in very slowly until the motor just smooths out. Next tighten the screw (L) in an upward position and recheck the adjustment for correctness.

PACKARD CARBURETORS

Two types of Packard air valve carburetors have been used on Packard automobiles from 1925 to 1928 inclusive. The early models were equipped with an electric fuelizer (A) Fig. 8 and the later models came without a fuelizer as shown in Fig. 9. The adjustment information for both types of carburetors is the same.

On all models of Packard equipped with Packard air valve carburetors there are two adjustments provided. One is the low speed adjustment which is made by means of the adjusting nut (A) Fig. 9 and the other is the high speed adjustment which is made by means of the adjusting nut (B).

High Speed Adjustment.—The operation of the carburetor at high speed is controlled by the inner air valve spring (C) Fig. 9. These springs are calibrated parts and should not be stretched or tampered with under any consideration. When the spring is furnished from the factory, it is of the correct length and stretching it will preclude

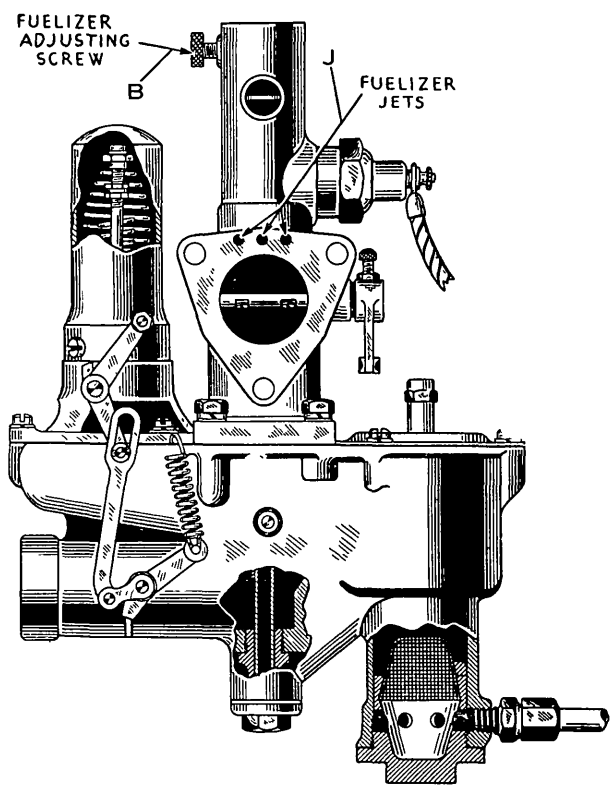


Fig. 7

Cutaway sectional view of Packard air valve carburetor used on early Model cars. This carburetor is equipped with a fuelizer, the purpose of which was to heat all fuel entering the intake manifold. For proper adjustment of the fuelizer, see Adjustment section.

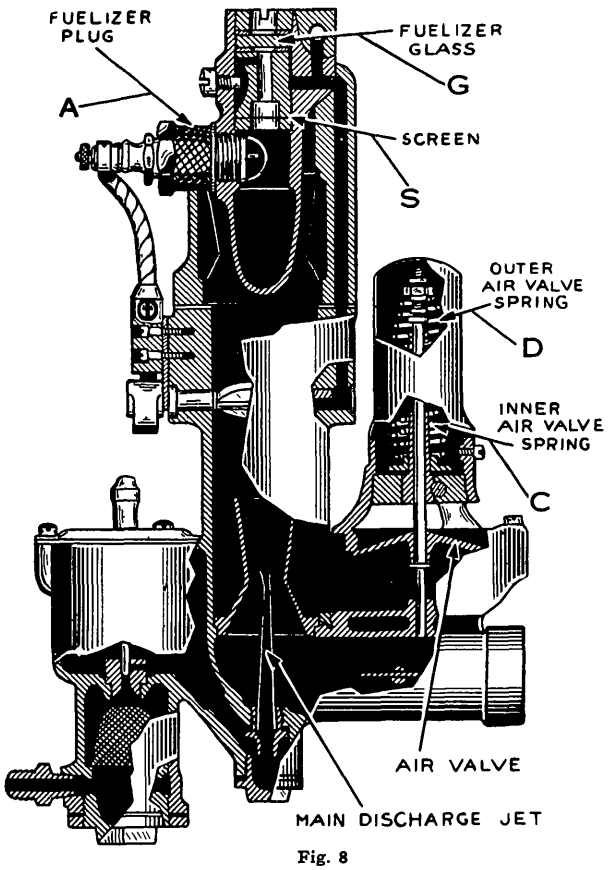


Fig. 8

Cutaway sectional view of Packard air valve carburetor used on early Model Packard cars showing the construction of the fuelizer and fuelizer plug. For complete instructions on the servicing of this unit, see Fuelizer under Carburetor Adjustment.

the possibility of obtaining a correct adjustment. (See Carburetor Specification Diagnosis section page 281 for correct air valve spring length).

The high speed adjustment will be correct when the distance between the lower edge of nut (B) and the top of the inner air valve spring is exactly 5/32". This measurement should be taken with a prong gauge exactly 5/32" in width.

Idle Adjustment.—Motor performance at idling speeds is controlled by the outer air valve spring (D) Fig. 9. These springs are calibrated parts and should not be stretched or tampered with under any consideration.

To make an idle adjustment, have the motor thoroughly warmed up, remove the case (E) and the idle adjusting nut (A) will be exposed. Loosen the lock nut above the idle adjusting nut (A) and turn the adjusting nut counter-clockwise or up until the motor slows down from a lean mixture. Then screw the adjusting nut down until the motor just smooths out. Lock the idle adjusting nut in this position and recheck the motor for correct idle adjustment.

Fuelizer Adjustment.—On early models of Packard air valve carburetors, an electric fuelizer was provided for the purpose of heating all fuel that passed into the manifold. This fuelizer consisted of a vaporizer plug (A) Fig. 8 which was inserted into a chamber in the upper body of the carburetor. The fuelizer operates by drawing the correct mixture of gasoline and air into the chamber which is ignited and caused to burn by an electric spark across the gap of the fuelizer plug. In order to obtain a correct combustible mixture, an air adjusting screw (B) Fig. 7 is provided. This screw regulates the amount of air which is drawn in and mixed with the gasoline that is sucked into the chamber by means of the vacuum created through the 3 fuelizer jets (J) Fig. 7.

If the fuelizer fails to operate as indicated by the presence of a bright green light which can be seen through the fuelizer glass (G) Fig. 8, the trouble may be caused by a defective fuelizer plug, a plugged-up fuelizer screen (S), plugged-up fuelizer jets (J) Fig. 7 or an improper fuelizer adjustment (B).

If the trouble is caused by a defective fuelizer plug, replace with a new unit. Never, under any consideration, use an ordinary spark plug. If the trouble is caused by a plugged up fuelizer screen or fuelizer jets, the trouble may be corrected by cleaning the faulty parts. It will be necessary to remove the carburetor from the manifold to clean the fuelizer jets. See information in Tune-Up Precautions immediately following Tune-Up Operations under the heading Ragged Idle. If the trouble is caused by an improper air adjustment, resulting in a mixture that will not burn, adjust the fuelizer adjusting screw (B), Fig. 7, until a bright green light can be seen through the fuelizer glass (G), Fig. 8.

Turning the fuelizer adjusting screw in cuts down the amount of air admitted to the fuelizer chamber and turning it out increases the amount of air admitted.

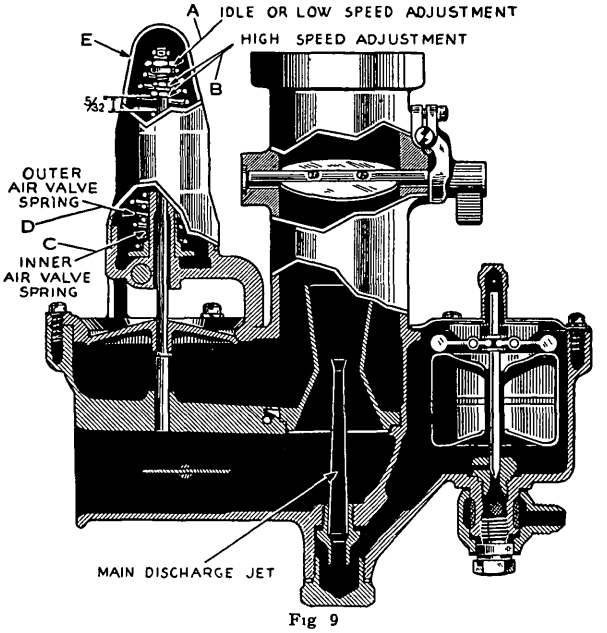


Fig 9

Cross sectional view of Packard air valve carburetors without fuelizer used on late Model Packard cars. All Packard air valve carburetors have two adjustments, one the low speed adjustment and the other the high speed adjustment Both adjustments operate to control the action of the air valve See Carburetor Adjustment for more complete information.

Peerless 1925-30

Motor Tune Up

Of all tune-up operations for Peerless automobiles, ignition timing and adjustment is the most important. Care should be exercised to see that the spark plug and distributor contact points are properly adjusted and clean. If trouble is experienced in obtaining proper motor efficiency make sure that the motor compression is good and even in all cylinders.

The carburetor is the last unit that should be checked and care should be exercised not to confuse a condition of improperly synchronized contact points with carburetor trouble. Special information covering motor tune-up will be found immediately following the tune-up operations. This information and the special information under Adjustment Precautions in the Carburetor Adjustment section should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: The above operation is necessary on all models except the V type 8 which are gear driven.
3. Synchronize distributor points.
   Note: The above operation is necessary only on eight cylinder models.
4. Check ignition timing; adjust if necessary.
5. Check valve tappet clearance; adjust if necessary.
6. Clean gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan belt; adjust if necessary.
   Note: On 1930 Peerless models the generator was driven by the fan belt.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Check heat control valve.
10. Check choke valve for position.
11. Check high tension wiring.
12. Clean and adjust carburetor.
    Note: The above operation includes removing and thoroughly cleaning all jets and passages. Check carburetor and manifold flanges with a straightedge. If found to be warped, true up with flat mill file. When replacing the carburetor on the car, make sure that all manifold flange nuts are drawn up evenly and that all manifold gaskets are tight.
13. Road test car.
    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Spark Plug Gaps.—Failure of the motor to idle properly may be due to incorrectly adjusted or improperly spaced spark plug gaps. On 1928 and 1930 models with high compression motors, the spark plug gaps should be uniformly adjusted to not less than .022″ nor more than .025″. On previous models with low compression motors the spark plug clearance should be uniformly adjusted to .030″.

Ignition Timing.—The symptoms caused by improperly synchronized points or retarded ignition timing are similar to those caused by a too rich carburetor mixture and extreme care should be exercised not to confuse these two conditions. When this trouble is encountered, the ignition timing should be checked before tampering with the carburetor. (See Ignition Timing procedure in Ignition Timing section).

Manifold Air Leaks.—A poor idling condition may be caused by air leaks at the manifold gasket between the carburetor and manifold flanges. To check for this trouble, use a squirt can full of light engine oil. If a change in motor performance is noticed when oil is squirted over the gasket, the gasket will be found to be leaky. Remove the carburetor from the manifold and check the flange with a straightedge. If found to be warped, true up with a flat mill file.

Plugged Up or Dirty Idling Jets.—A poor idling condition on cars equipped with Stromberg carburetors may be caused by dirty or plugged up idling jets. If difficulty is experienced in obtaining a correct idling adjustment, check to see that the idling jets both above and below the throttle are not plugged up. The carburetor should be removed from the car and all jets and passageways washed in clean gasoline and blown clear with air.

Poor Acceleration

Ignition Governor.—The distributor governor assembly should be inspected to see that the weights work freely and do not stick in the retarded position. Any tendency toward sluggish operation of the governor weights will affect motor performance on acceleration.

High Tension Wiring.—A condition of poor acceleration may be caused by weak ignition as the result of a loss of high tension current through weak or faulty high tension wiring insulation. The high tension wiring should be closely checked for cracks in the insulation or any tendency toward bloating or softness. If the insulation is found to be defective, replace with new high tension wires.

Lack of Power

Ignition Timing.—Lack of power may be caused by late ignition or valve timing. Check both valve and ignition timing and make sure that eight cylinder distributors are properly synchronized.

OIL PRESSURE

Model and Year	Min.	Max.
70—1925	35 lbs	45 lbs.
8-67—1925-26		
6-72—1926	35 lbs	45 lbs
6-80—1926-27-28	35 lbs	45 lbs.
6-90, 6-91—1927-28	35 lbs.	45 lbs.
6-60—1928	35 lbs.	45 lbs.
8-69—1928		
6-61—1929	35 lbs.	45 lbs.
6-81—1929	35 lbs.	45 lbs.
Eight (125)—1929	35 lbs.	45 lbs.
6-91—1929	35 lbs.	45 lbs.
Standard Eight—1930	35 lbs.	45 lbs.
Master Eight—1930	35 lbs.	45 lbs.
Custom Eight—1930	35 lbs.	45 lbs.

IGNITION TIMING

Ignition Timing Table

The following table contains ignition timing data for all models of Peerless from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
PEERLESS						
1925	70	020″–027″	*15°B	Adv	030″	1-5-3-6-2-4
1925-26	8-67	015″–020″	*T C	Ret	030″	1R-1L-4R-4L 2L-3R-3L-2R
1926	6-72	020″–027″	*15°B	Adv	030″	1-5-3-6-2-4
1926-27-28	6-80	020″–024″	*IGN	Adv	030″	1-5-3-6-2-4
1927-28-29	6-90, 6-91	020″–024″	*15°B	Adv	030″	1-5-3-6-2-4
1928	6-60	020″–024″	*IGN	Adv	030″	1-5-3-6-2-4
1928	8-69	022″–027″	*15°B	Adv	030″	1R-1L-4R-4L 2L-3R-3L-2R
1929	6-61	018″–020″	*IGN	Adv	030″	1-5-3-6-2-4
1929	6-81	018″–020″	*IGN	Adv	030″	1-5-3-6-2-4
1929	Eight (125)	022″	*T C	Ret	030″	1-6-2-5-8-3-7-4
1930	Standard 8	018″–020″	*⅝″B	Adv	030″	1-6-2-5-8-3-7-4
1930	Master 8	018″–020″	*¾″B	Adv	030″	1-6-2-5-8-3-7-4
1930	Custom 8	018″–020″	*¾″B	Adv	030″	1-6-2-5-8-3-7-4

Adv —Spark fully advanced B —Before top dead center T C — Top dead center Ret —Spark lever fully retarded
*The flywheel rim is stamped with ignition timing marks

Peerless Models 70 1925, 6-72 1926, 6-90-91 1927-28-29.—The contact points should just start to separate when No. 1 piston is 15 degrees (flywheel travel) before top dead center of the compression stroke. The spark lever should be in the fully advanced position. The flywheel rim is provided with ignition timing marks. (See Ignition Timing Table for contact point gap clearance).

Peerless Models 8-67 1925-26, 8 (125) 1929.—The contact points should just start to separate when piston No. 1 is at top dead center of compression stroke; the spark lever should be in the fully retarded position.

Model 8-67 is equipped with an ignition distributor having two sets of contact points. Both sets of points should break contact simultaneously.

Model 8 (125) has a distributor with two sets of breaker contacts and two separate ignition coils. The procedure for synchronizing both types of distributors will be found in the following paragraphs. (See Ignition Timing Table for contact point clearance and firing order).

Peerless Models 6-80 1926-27-28, 6-60 1928, 6-61 1929, 6-81 1929.—The contact points should just start to separate when No. 1 piston entering compression stroke is in firing position as indicated by the flywheel mark IGN; with the spark control lever in the fully advanced position, the flywheel mark IGN should register with the pointer of the peekhole in the flywheel housing.

Peerless Model 8-69 1928.—The ignition distributors used on these models have double breaker arms and a four lobe cam. One set of contact points is mounted on a stationary base and the other set is movable. The motor should be timed by the stationary set of points The contact points should just start to separate when No. 1 piston is 15 degrees (flywheel travel) before top dead center of the compression stroke. The flywheel rim is stamped with ignition timing marks. The spark control lever should be in the fully advanced position. (See Ignition Timing Table for contact point gap clearance).

For complete synchronizing procedure, see information under To Synchronize Eight Cylinder Distributors With Four Lobe Cam below.

Peerless Standard Eight 1930.—These motors are equipped with Auto-Lite ignition distributors having two sets of breaker arms and a four lobe cam. One set of breaker arms is mounted on a stationary base and the other set is mounted on a movable base. To time the distributor to the motor, the stationary set of contact points should just start to separate when No. 1 piston is 5/8″ (flywheel travel) before top dead center of the compression stroke. The spark lever should be in the fully advanced position. (See Ignition Timing Table for contact point gap clearance).

For complete synchronizing information see information under heading To Synchronize Eight Cylinder Auto-Lite Distributors With Four Lobe Cam.

Peerless Master Eight and Custom Eight 1930.—The ignition distributors used on these models have two sets of contact arms and a four lobe cam. One set of contact points are mounted on a stationary base and the other is mounted on a movable base. To time the distributor to the motor, the stationary set of contact points should just start to separate when piston No. 1 is ¾″ (flywheel travel) before top dead center of the compression stroke. The spark control lever should be in the fully advanced position. (See Ignition Timing Table for contact point clearance).

For complete synchronizing information see information under To Synchronize Eight Cylinder Auto-Lite Distributors With Four Lobe Cam.

To Synchronize Eight Cylinder Distributors With Eight Lobe Cam (Contact Points Open Simultaneously) —Connect a test lamp across each set of contact points. Adjust the contact points until both lamps light simultaneously when the points just open.

To Synchronize Eight Cylinder Delco Distributors With Four Lobe Cam.—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate. The points are arranged to break contact 45 degrees apart distributor shaft rotation which is equal to 90 degrees of flywheel travel. One ignition coil is used. Adjust both sets of contact points to the correct clearance as given in the ignition timing table. Use synchronizing tool No. 822572, Fig. 1, which can be obtained at any United Motor service branch or authorized Delco-Remy service station. The distributor cam must be removed in order to use this tool and much time can be saved in retiming the distributor to the motor if the position of the rotor is marked or spotted before removing the cam.

Turn the rotor against rotation with the fingers, take up the backlash in the gears and mark the position of the rotor with a corresponding mark on the side of the distributor housing, then remove the rotor. Loosen the lock screw in the center of the cam and remove the cam. Place the synchronizing tool, Fig. 1, on the distributor shaft and rotate the tool with the fingers or pliers until the contact point rubbing block drops into the notches in the side of the tool. Loosen the lock screws which hold the movable plate and adjust this plate by turning the eccentric screw with a screwdriver until both sets of contact rubbing blocks fit evenly against the flat sides of the notches in the synchronizing tool.

On early models which do not have an adjustable plate and eccentric screw, the entire contact point plate which holds both sets of points must be moved until both rubbing blocks fit evenly against the sides of the notches in the tool.

Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy. Replace the distributor cam and rotor and turn the rotor until the scratch marks on the rotor register with the mark on the distributor housing. Remove the rotor and tighten the lock screw in the center of the cam and recheck the rotor scratch marks again, making sure that the rotor is held against rotation to take up backlash.

To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (2 ignition coils).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate and arranged to break 45 degrees apart of distributor shaft rotation which is equal to 90 degrees of flywheel travel. Adjust both sets of contact points to the correct clearance as given in the Ignition Timing Table. Use synchronizing tool No. 1835009, Fig. 2, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station. Rotate the distributor shaft in the direction of rotation until the contact points on the stationary plate just open. This point should be determined by the aid of an ammeter or test lamp connected in series with the primary ignition lead. With the ignition switch turned on, the instant the points break the ammeter needle will return to zero if an ammeter is used or the lamp will go out if a lamp is used. Hold the distributor shaft exactly in this position and clamp the synchronizing tool to the side of the distributor with one edge on the rotor point directly even with the zero mark on the scale stamped on the edge of the tool.

Next turn the distributor in the direction of rotation until the same edge of the rotor is even with the 90 degree mark on the scale of the tool. Hold the distributor exactly in this position and adjust the movable plate by loosening the lock screws over the plate and turning the eccentric screw with a screwdriver until the contact points just open. The above information is for a clockwise distributor. When timing a counter-clockwise distributor, just reverse the operation. Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy.

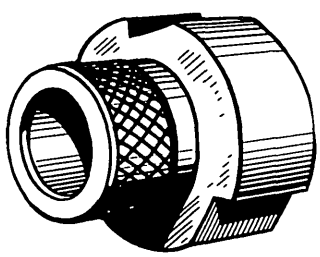


Fig 1

Delco-Remy synchronizing tool used on Peerless distributors having double breaker arms. For the complete synchronizing procedure see Ignition Timing.

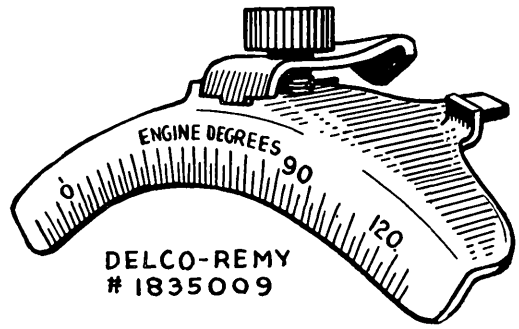


Fig 2

Delco-Remy synchronizing tool No. 1835009 used to synchronize double breaker arm distributors used on Peerless automobiles. For complete synchronizing information see Ignition Timing.

To Synchronize Eight Cylinder Auto-Lite Distributors With Four Lobe Cam.—On Auto-Lite IGH distributors one set of points is carried on a main breaker plate assembly and the other set is carried on a sub plate mounted on the main plate. To synchronize, first adjust both sets of points to the proper clearance. (See Ignition Timing Table). The fixed breaker points are adjustable for gap openings by loosening the lock screw (A) Fig. 3, and the pivot screw (B) and adjusting with eccentric screw (C). After obtaining the correct gap, be sure both screws (A) and (B) are tight. Adjust-

ment of the gap for the sub plate breaker points is made by the conventional screw point and lock nut.

To synchronize the two sets of points, first insulate the sub plate points from each other by placing a thin piece of fiber between them. Then crank the engine until the breaker points just open. This can be indicated by a timing light connected across the breaker arm and to ground. The points should be adjusted so that the timing light will light when the breaker cam backlash is turned in the direction of drive and go out when the backlash is turned against rotation.

On the top of the fan tail of the rotor will be found two timing marks 45 degres apart (left view Fig. 4). With the rotor backlash taken up in the direction of drive place the synchronizing gauge (right view Fig. 4) on the edge of the distributor base so that the point is exactly in alignment with the clockwise line on right hand rotation distributors, or with the counter-clockwise line for left hand distributors. Next crank the engine until the other timing line on the distributor rotor is exactly in alignment with the point of the synchronizing gauge. Make sure that any backlash in the rotor is taken up in the direction of drive.

With the distributor rotor in this position, the sub plate point should be adjusted so that the timing light will light when the breaker arm backlash is turned in the direction of drive and go out when the backlash is turned against rotation. Before this test can be made the fiber between the sub plate points should be removed and inserted between the other set of points.

The sub plate points can be adjusted by loosening the two lock screws (D), Fig. 3, and rotating

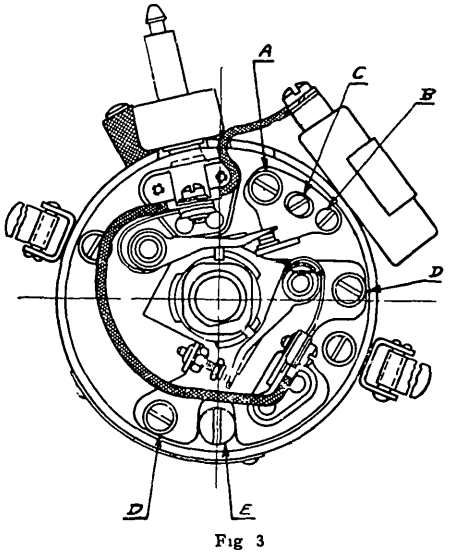


Fig 3

Top view of Auto-Lite IGH distributor showing the stationary and adjustable sets of points.

the sub plates with the eccentric screw (E) until the proper setting is obtained.

After synchronizing the two sets of points, turn the engine over a few times and recheck to make sure the exact setting has been obtained.

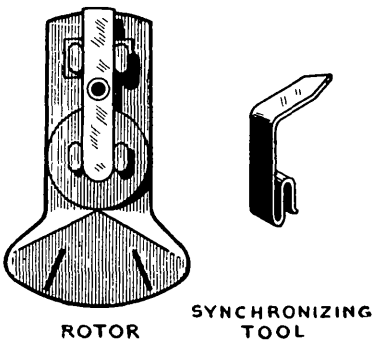


Fig 4

View of rotor used on Auto-Lite distributors IGH and synchronizing tool.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for all Peerless models from 1925 to 1930 inclusive Tappet clearances are for hot motor unless otherwise designated.

Year	Model	Tappet Adjustment				Valve Timing		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
PEERLESS								
1925	70		008″	006″	006″	T C		Closes
1925-26	8-67		008″	007″	007″	T C		Closes
1926	6-72		008″	006″	006″	T C		Closes
1926-27-28	6-80		008″	004″	006″	*1°A		Closes
1927-28-29	6-90, 6-91		008″	006″	006″	T C		Closes
1928	6-60		008″	004″	006″	*5°A		Closes
1928	8-69		008″	007″	007″	T C		Closes
1929	6-61		008″	004″	006″	*5°A		Closes
1929	6-81		010″	004″	006″	*5°A		Closes
1929	Eight (125)		008″	007″	007″	*5°A		Closes
1930	Standard 8		008″	007″	007″	*8°A		Closes
1930	Master 8		008″	007″	007″	*2°A		Closes
1930	Custom 8		008″	007″	007″	*2°A		Closes

A —After top dead center. T C —Top dead center
*The flywheel rim is stamped for ignition and valve timing

Peerless Models 70 1925, 8-67 1925-26, 6-72 1926, 6-90-91 1927-28-29, 8-69 1928.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008″. The exhaust valve should just close at top dead center of the exhaust stroke (see Valve Timing Table for tappet clearances).

Peerless Model 6-81.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .010″. The exhaust valve should just close 5 degrees after top dead center of the exhaust stroke or when the flywheel mark EX-C 1-6 is at the indicator of the peekhole in the flywheel housing. (See Valve Timing Table for tappet clearance).

After the timing operation is complete, reset the valve tappets to the correct clearance.

Peerless 6-80 1926-27-28.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008″. The exhaust valve should just close 1 degree after top dead center of the exhaust stroke or when the flywheel mark EX-C 1-6 is at the indicator of the peekhole in the flywheel housing. After the timing operation is complete, reset the valve tappets to the correct clearance. (See Valve Timing Table for valve tappet clearances).

Peerless Model 6-60 1928, 6-61 1929, Eight (125) 1929.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008″.

The exhaust valve should just close 5° after top dead center of the exhaust stroke for No. 1 piston. The piston position can be determined by flywheel mark EX-C 1 which should register with the indicator of the peekhole in the flywheel housing. After the timing operation has been completed, reset the valve tappet clearance. (See Valve Timing Table for tappet clearances).

Peerless Standard Eight 1930.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008". The exhaust valve should just close 8° after top dead center of the exhaust stroke for No. 1 piston. The flywheel is marked with exhaust valve timing marks. After the timing operation is complete, reset the valve tappet clearance. (See Valve Timing Table for valve tappet clearances).

Peerless Master and Custom Eight 1930.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008". The exhaust valve should just close 2° after top dead center of the exhaust stroke for No. 1 piston. The flywheel is marked with exhaust valve timing marks. After the timing operation is complete, reset the valve tappet clearance. (See Valve Timing Table for tappet clearances).

TIMING CHAIN ADJUSTMENT

All Six Cylinder Models 1925-30.—All six cylinder models of Peerless are provided with a manual timing chain adjustment. To adjust the chain, loosen the nuts that hold the generator to the timing chain case and with a small bar between the cylinder block and the generator, pry the generator away from the motor. When the chain begins to hum, slowly relieve the pressure on the bar until the noise disappears, then tighten the nuts. Be careful not to leave the chain too tight as it will overload and burn out the generator bearings.

On Peerless Models equipped with Continental motors an adjustment screw is provided for the purpose of moving the generator. The adjustment should be made in the same manner as described above except that the use of a small bar is unnecessary.

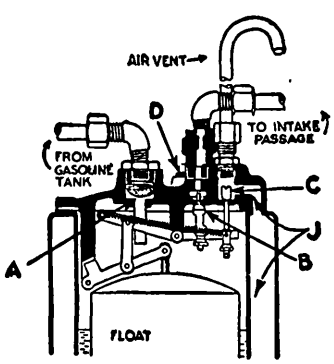


Fig. 5

A condition of poor motor performance may be caused by dirty gas line screens. To clean the screen (A) in the top of the vacuum tank, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

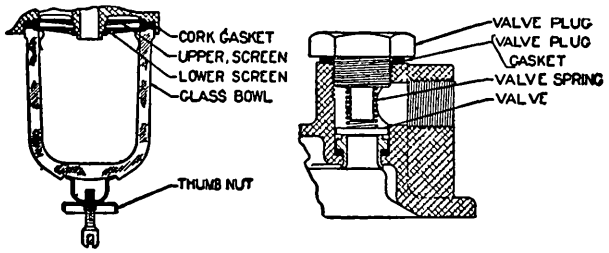


Fig. 6

As shown in the illustration, two gas line screens are located in the top of the fuel pump bowl. To clean these screens, remove the bowl and wash the screens in clean gasoline. When replacing the bowl, make sure that the cork gasket at the top of the bowl is tight and does not leak. When servicing the fuel pump, make sure that the pump valves do not leak. As shown in the right view, the valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

GASOLINE SCREENS

Peerless all models equipped with vacuum tank fuel feed have two strainer screens in the gas line. One screen is located in the head of the vacuum tank, Fig. 5, and the other screen is located in the carburetor. On cars with a sediment bowl at the bottom of the vacuum tank, a third strainer screen will be found in the top of the sediment bowl.

To clean the gas line screen in the top of the vacuum tank, remove the feed line and hexagon bushing together with the gas line screen, wash in clear gasoline and blow dry with air.

Peerless all models equipped with fuel pump feed have two strainer screens in the gas line. One screen is located in the top of the fuel pump bowl and the other is located at the carburetor. To clean the strainer screen in the top of the fuel pump bowl, Fig. 6, remove the glass bowl and wash in clean gasoline. When replacing the glass bowl, make sure that the gasket between the top of the bowl and the body flange is tight and does not leak.

Carburetor Specifications

FLOAT LEVEL

Schebler Carburetors

Schebler Model T-1¼".—The fuel will stand at the correct level in the float bowl when the distance from the top of the float to the carburetor body measures 1¾". The float level can be adjusted by bending the float arm up or down the desired distance. Before bending the float arm, be sure that the float valve seats properly and that the gaskets and the float brackets are firmly in place. The float must be checked for clearance in the float chamber. This is done by placing the upper half of the carburetor body on the lower half using the venturi as a guide. Holding the two halves of the carburetor in line, see that the float

has clearance enough on each side of the float chamber to permit of free movement. Should the float touch either side of the float chamber, bend the float arm carefully until the float works freely.

Schebler Model UX-1¼".—The float level will be correct when the distance from the top of the float to the milled flange on the lower half of the carburetor body is 15/16" with the bowl gasket removed. This measurement should be taken with the carburetor held in the inverted position so that the float lever is resting on the float valve in the closed position. If it should be necessary to change the float level adjustment, bend the float lever arm up or down until the desired adjustment is obtained.

Schebler Model SX-1¼" Duplex.—The fuel level in the float bowl will stand at the correct height when the distance between the float and the carburetor body measures from 25/64" to 27/64" with the float valve in the seated position. If it should be necessary to change the float level adjustment, bend the float lever arm up or down until the desired height is obtained.

Stromberg Carburetors

Stromberg Model O-3.—The fuel will stand at the correct level in the float bowl when the distance measured from the surface of the fuel to the top surface of the float chamber casting is 1" or just even with the bottom of the sight level hole which is in the side of the float chamber casting. To adjust the float level, remove the needle valve cap from the top of the float chamber cover and the float needle stem will be seen. Loosen the lock nut and with a wrench on the flat sides of the needle sleeve, screw the needle down clockwise until it just seats then back it up two turns off its seat. With this adjustment, the fuel should stand at the correct level; however, the needle may be turned either down or up until the desired level is obtained.

Stromberg OX-2.—The float level adjustment for this model of Stromberg carburetor used on Peerless automobiles is the same as that for Stromberg OE-3 given in the above paragraph.

Stromberg Model TX-2.—The gasoline level in the float chamber should stand, with the motor not running, even with the bottom of the sight level hole which is in the side of the float chamber casting. The fuel level adjustment may be changed by bending the float lever arm upward to raise the level and downward to lower the level. The float should be set correctly when the top of the float measures 7/32" from the bottom base of the float chamber cover, with the float needle in the seated position.

Stromberg Model UX-2.—With the motor not running, the gasoline in the float bowl should stand 9/16" below the top of the float bowl casting. The float level may be changed by bending the float lever arm up to raise the level and down to lower the level. The setting should be approximately correct when the top of the float at the center measures 3/64" from the lower surface of the gasket base of the cover.

CARBURETOR SPECIFICATION DIAGNOSIS

The following paragraphs contain carburetor specification information for Schebler and Stromberg carburetors used on Peerless automobiles. The information will be found arranged under the carburetor heading.

SCHEBLER CARBURETORS

Peerless 1930 Models came equipped with three models of Schebler carburetors. Complete information for each type of carburetor will be found under the carburetor model heading in the Schebler section in the back of this book.

Carburetor Specifications.—Schebler carburetor specifications include only those parts that are most likely to be at fault if a correct carburetor adjustment cannot be obtained. Carburetor specifications will be found in the tables below.

Peerless Master 8 1930

(Schebler UX-1¼" Engine 3⅜"x4½")

Description of part	Part No. or size
Air Valve Spring	*49–M
Needle Valve complete	†#10
Accel. Pump Cross Passage	‡#50
Accel Pump Cylinder	#12

*The dimensions of the air valve springs are as follows No of coils 11, length 3⅛", wire gauge 14

†The needle assembly number is indicated by the number of rings machined on the needle body

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #50 passage is the same size as a #50 wire drill The size of the passage is stamped on the side of the body of the passage

Peerless Custom 8 1930

(Schebler SX-1¼ Dup Engine 3⅜"x4½")

Description of part	Part No. or size
Air Valve Spring	*16–48–I
Needle Valve complete	†#11
Accel Pump Cross Passage	‡#60
Accel Pump Cylinder	#5

*The dimensions of the air valve springs are as follows No of coils 8½, length 2¼" to 2¾", wire gauge 20

†The needle assembly number is indicated by the number of rings machined on the needle body

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #60 passage is the same size as a #60 wire drill The size of the passage is stamped on the side of the body of the passage

STROMBERG CARBURETORS

Several models of Stromberg carburetors have been used on Peerless automobiles from 1925 to 1929 inclusive. Complete carburetor specification diagnosis information will be found in the Stromberg section under the carburetor model heading for each carburetor used on Peerless automobiles.

Specification Tables.—The following specification tables contain carburetor calibration specifications for each model of Peerless using Stromberg carburetors.

Peerless 8-67 1925-28

(Stromberg OE-3 Engine 3¼"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#53–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")		#60
Main Discharge Jet		‡#A–38, #B–20
High Speed Air Bleeder		
Accelerating Well Bleeder		†#28–#32
Accel Well Discharge Jet		#53
Venturi	1 7/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #53 wire drill size

†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size

‡First bore of main discharge jet is a #38 wire drill, second bore #20 wire drill

Peerless 6-80 1925-26-27-28

(Stromberg OX-2 Engine Cont 8U, 3¼"x 4⅝")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#54–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 9/32")		#56
Main Discharge Jet		‡#A–30, #B–20
High Speed Air Bleeder		
Accelerating Well Bleeder		†#28–#32
Accel Well Discharge Jet		#56
Venturi	1 3/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #54 wire drill size

†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size

‡First bore of main discharge jet is #30 wire drill, second bore #20 wire drill

Peerless 6-90, 6-91 1926-27-28

(Stromberg OE-2 Engine 3½"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#56–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ¼")		#56
Main Discharge Jet		‡#A–34, #B–18
High Speed Air Bleeder		
Accelerating Well Bleeder		†#32–#34
Accel Well Discharge Jet		#55
Venturi	1 5/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #56 wire drill size

†This is a double end bleeder having one end #32 wire drill size and other end #34 wire drill size

‡First bore of main discharge jet is #34 wire drill, second bore #18 wire drill

Peerless 6-60 1927-28

(Stromberg TX-2 Engine Cont 1OE 3¼"x 4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#54–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")		Blank
Main Discharge Jet		‡#A–38, #B–18
High Speed Air Bleeder		#70
Accelerating Well Bleeder		†#30–#34
Accel Well Discharge Jet		#54
Venturi	1 3/32"	

*The idle jet above the throttle is a #70 wire drill size, the jet below the throttle is a #54 wire drill size

†This is a double end bleeder having one end #30 wire drill size and other end #34 wire drill

‡First bore of main discharge jet is #38 wire drill, second bore #18 wire drill

Peerless 8-69 1928

(Stromberg OE-3 Engine 3¼"x 5")

Description of Part	Size thousandths inch	Wire drill size
Main Discharge Jets		*#53–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")		#60
Main Discharge Jet		‡#A–38, #B–20
High Speed Air Bleeder		
Accelerating Well Bleeder		†#28–#32
Accel Well Discharge Jet		#53
Venturi	1 7/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #53 wire drill size

†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size

‡First bore of main discharge jet is #38 wire drill, second bore #20 wire drill

Peerless 8-67 1925-26-27-28

(Stromberg O-3 Engine 3¼"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#53–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift 5/16")		#60
Main Discharge Jet		‡#A–38, #B–20
High Speed Air Bleeder		
Accelerating Well Bleeder		†#28–#32
Accel Well Discharge Jet		#53
Venturi	1 7/32"	

*The idle jet above the throttle is a #66 wire drill size, the jet below the throttle is a #53 wire drill size

†This is a double end bleeder having one end #28 wire drill size and other end #32 wire drill size

‡First bore of main discharge jet is #38 wire drill, second bore #20 wire drill

Peerless 6-61 1929

(Stromberg UX-2 Engine Cont 3⅜"x 4")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#55–#70
Main Metering Jet		
High Speed Needle Valve (open No notches)		Adjustable
By-Pass Jet	031"	
Main Discharge Jet		#32
High Speed Air Bleeder		#65
Pump Reducer		#68
Accelerating Nozzle		
Venturi Tube (size in inches)	31/32"	

*The idle jet below the throttle is #55 wire drill size, the jet above the throttle is #70 wire drill size

Peerless 6-81 1929

(Stromberg UX-2 Engine Cont 15U, 3⅜"x 4⅝")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets		*#54–#68
Main Metering Jet		
High Speed Needle Valve (open No notches)		Adjustable
By-Pass Jet	040"	
Main Discharge Jet		#40
High Speed Air Bleeder		#56
Pump Reducer		#62
Accelerating Nozzle		
Venturi Tube (size in inches)	1 1/16"	

*The idle jet below the throttle is #54 wire drill size, the jet above the throttle is #68 wire drill size

Peerless Eight (125) 1929

(Stromberg UU-2 Engine Cont. 12K, 3⅜"x4½")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets (top one)..	.....	#56
Idle Discharge Jets (lower two)	.....	#55
Main Metering Jet	.046"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-Pass Jet	.....	.....
Main Discharge Jet	.....	†#A-30, #B-20
High Speed Air Bleeder	.....	#70
Pump Reducer	.....	#70
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)..	1⅛"	.....

*The idle jets below the throttle are #55 wire drill size; the jet above the throttle is #56 wire drill size.

†First bore of main jet is #30 wire drill; second bore is a #20 wire drill.

Peerless 6-91 1928-29

(Stromberg UX-3 Engine 3¼"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#50–#64
Main Metering Jet	.071"	.....
Economizer Needle Valve (needle lift.....)	.....	.....
Main Discharge Jet	.....	#28
High Speed Air Bleeder	.....	#60
By-Pass Jet	.028"	.....
Accel. Well Discharge Jet	.....	.....
Venturi	1⅛"	.....

*The idle jet above the throttle is a #64 wire drill size; the jet below the throttle is a #50 wire drill size.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
PEERLESS					SCHEBLER
1930	Std. 8	Own	8	2⅞"x4¾"	T-1¼"
1930	Master 8	Own	8	3⅜"x4½"	UX-1½"
1930	Custom 8	Own	8	3⅜"x4½"	SX-1¼" Duplx.
					STROMBERG
1925	8-67	Own	8	3¼"x5 "	OE-3
1926	6-80	Cont. 8U	6	3¼"x4⅝"	OX-2
1926	8-67	Own	8	3¼"x5 "	OX-3
1927-28	6-80	Cont. 8U	6	3¼"x4⅝"	OX-2
1927-28	6-90 6-91	Own	6	3½"x5 "	OE-2
1928	6-60	Cont.	6	3¼"x4 "	TX-2
1928	8-69	Own	8	3¼"x5 "	OE-3
1929	6-61	Cont.	6	3⅜"x4 "	UX-2
1929	6-81	Cont. 15U	6	3⅜"x4⅝"	UX-2
1929	Eight (125)	Cont. 12K	8	3⅜"x4½"	UU-2
1929	6-91	Own	6	3½"x5 "	UX-3

ADJUSTMENT PRECAUTIONS

Stromberg and Schebler carburetors have been used as equipment on Peerless automobiles from 1925 to 1930 inclusive. The Stromberg carburetor is of the plain tube type having fixed fuel jets and air passages, while the Schebler carburetor is of the air valve type. Before attempting an adjustment on either type of carburetor, read the following paragraphs carefully.

Effect of Intake Manifold on Carburetor Adjustment.—It is important when making a carburetor adjustment that from 10 to 15 seconds time be allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making a range adjustment on Schebler Model U carburetors. Take for example an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained.

Effect of Leaky Bowl on Adjustment.—On all Model U Schebler carburetors a correct adjustment cannot be obtained unless the gasoline bowl is absolutely tight against the body flange. If the bowl has been removed for any reason, a new bowl gasket should be used and checked for leaks.

If the car owner should complain of poor motor performance, check to see that the power adjustment is set according to the factory setting (see Carburetor Adjustment for Model U) and then check the economy and idle adjustments carefully. See that the idle tube is in place and not rubbing the needle valve lift lever. Inspect to see that the throttle shaft works freely and that the throttle disc closes correctly.

Auxiliary Needle Valve Held Open.—On cars equipped with Stromberg Model U carburetors low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever thus holding the auxiliary needle valve open.

To correct, set the auxiliary control lever cam so that there is approximately 1/16" clearance between the cam and the auxiliary control lever. Also check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works freely.

High Vacuum in Manifold (Stromberg Model U).—If difficulty is experienced in obtaining a correct idling adjustment, a condition of high vacuum may exist in the manifold over the throttle valve. This trouble may also be noticeable on deceleration. The car may idle properly on the service floor but when the motor is accelerated to full open throttle, and then decelerated suddenly to full closed throttle, a tendency to Roll and load will be noticed. In extreme cases the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct this trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless the trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass.

SCHEBLER CARBURETORS

Three types of Schebler carburetors are used on Peerless 1930 automobiles. Before attempting a carburetor adjustment, read the information included under Adjustment Precautions above.

Schebler Model T-1¼".—This carburetor is of the plain tube type in which a single fixed size venturi is used. Normally, all the air except that which passes through the idle air bleed and idle system passes through this fixed venturi. All the metered fuels except the idle fuel and warming up and starting fuels passes through a nozzle whose tip extends into the throat of the venturi and the fuel mixes at the throat of the venturi with the air passing through.

There are no moving parts controlling the normal metering of the fuels except a throttle operated metering pin which only changes a fuel feed opening from one size to a larger size when the throttle is wide open.

Complete information on the Schebler Model T carburetor and the factory adjustment procedure will be found in the Schebler section under the heading Schebler Model T.

Schebler Model UX-1½".—The Model U Schebler carburetor is of the air valve type having two air inlets. This carburetor is very similar to the Schebler Model S carburetor and complete information covering factory adjustment procedure will be found under the heading Schebler Model U in the Schebler section in the back of this book.

Schebler Model SX-1¼" Duplex.—The Model S is an air valve carburetor having two air inlets; the fixed air opening is through the venturi and is very small, passing barely enough air to enable the engine to idle slowly. Due to the small opening through the venturi, the velocity of the air passing through it is very high even when the engine is idling. This enables it to pick up gasoline at the nozzle and atomize thoroughly.

The mixture at higher speeds is controlled by the air valve which comes into action as soon as the throttle is opened sufficiently to create vacuum enough in the fuel mixing chamber to cause the air valve to be forced open.

Complete information covering the Schebler Model S carburetor will be found in the Schebler section in the back of this book. The complete factory adjustment procedure for the brass bowl, die cast bowl and stamped bowl carburetors is also given.

STROMBERG CARBURETORS

Several models of Stromberg carburetors have been used on Peerless automobiles from 1925 to 1929 inclusive. These carburetors are all of the plain tube type having fixed air passages and fuel jets.

Stromberg Model O-3.—This carburetor is equipped with idle openings above and below the throttle controlled by a separate adjustment; an accelerating well which gives an extra supply of fuel just for a moment as the throttle is opened; an economizer which permits the carburetor to operate on a very lean mixture at closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the motor is called for.

Complete adjustment information will be found in the Stromberg section under Stromberg Model O in the back of this book.

Stromberg Model OE-3.—This carburetor is practically the same as the Stromberg O-3 and complete adjustment information will be found in the Stromberg section in the back of this book.

Stromberg Model OX-2.—This carburetor is practically the same as the Stromberg O-3 and complete adjustment information will be found in the Stromberg section under Stromberg O.

Stromberg TX-2.—This carburetor is practically the same as the Stromberg O with the exception that the float bowl is of a different design and the high speed air bleeder is a separate opening in the body of the carburetor with the economizer needle blank while on the Model O type the economizer needle is drilled.

Complete carburetor adjustment information will be found in the Stromberg section in the back of this book under Stromberg Model T.

Stromberg Model UX-2.—This carburetor carries a warming up control; a positive acting accelerating device consisting of a pump which delivers an accelerating charge immediately the throttle is opened and delivers this charge over a definite period of time; idle and low adjustment jets above the throttle with separate idle adjustment for smooth low speed performance; an economizer which permits the carburetor to operate on a very lean mixture at the closed throttle positions of average driving but automatically shifts to the needed richer setting when the full power of the engine is called for.

A complete description of this carburetor together with the factory adjustment procedure will be found in the Stromberg section in the back of this book under the heading Stromberg Model U.

Stromberg Model UX-3.—This carburetor is practically the same as Stromberg UX-2 and complete adjustment information will be found under Stromberg Model U in the Stromberg section in the back of this book.

Stromberg Model UU-2.—This carburetor is a twin duplex carburetor employing the standard Stromberg construction used in the Model U.

Complete adjustment information will be found under Stromberg Model U in the Stromberg section in the back of this book.

Pierce-Arrow 1925-30

Motor Tune-Up

When tuning a Pierce-Arrow motor, best results will be obtained if all timing adjustments are made by flywheel timing marks. In extreme cases, it is advisable to road test the car if trouble is experienced in obtaining maximum efficiency. However, in the majority of cases it will be found that the motor will give best performance when timed by the flywheel marks.

Immediately following the tune-up operations will be found special tune-up information which should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Synchronize distributor points.
3. Check ignition timing; adjust if necessary.
   Note: This operation includes checking the condenser and ignition coils to see that there is a good full spark.
4. Adjust valve tappets and free up valves.
   Note: On Pierce-Arrow Models 80 and 81 extreme care should be exercised to hold the valve adjusting screw when loosening the lock nut, otherwise there is danger of breaking the valve tappet guide.
5. Clean gas line strainers and screens; also check gas lines for loose fittings.
6. Check fan and generator belts; adjust if necessary.
   Note: On Pierce-Arrow 1930 models two matched fan belts are used. Never use an old and new fan belt together. If it should be necessary to replace one belt, replace both with new matched belts.
7. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
   Note: All models of Pierce-Arrow have grease cups on the water pump. Never use anything but special water pump grease.
8. Check heat control valve.
9. Check throttle valve for opening.
10. Check manifold gasket; see that all manifold flange nuts are tight.
11. Adjust carburetor.
12. Road test car.
    Note: The flywheels on all Pierce-Arrow models are stamped with ignition and valve timing marks. Best engine performance will be obtained when the motor is timed by the flywheel marks.

Ragged Idle

Ignition Timing Not Properly Synchronized.—A poor idling condition on Pierce-Arrow Models equipped with double breaker arm distributors may be caused by the breaker arms not being properly synchronized. If the points are not properly synchronized, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speed.

To correct this condition, synchronize the points as described under Ignition Timing.

Spark Plug Gap Clearance.—A poor idling condition may be caused by an improper spark plug gap clearance. The spark plug gap clearance should not be less than .027″ nor more than .033″. However, in extreme cases where trouble is experienced at idling speed, a wider spark plug gap setting may correct the trouble.

Dirty Idling Jets.—A poor idling condition may be caused by plugged up or dirty idling jets. If proper results are not obtained when making an idle adjustment, check to see that the idling jets are clean. Also, see that the idling tube is free of dirt.

In cases where there are indications of dirt in the carburetor, the carburetor should be removed from the manifold and all jets and passageways washed in clean gasoline and blown dry with air.

Low Gasoline Mileage

Auxiliary Needle Valve Held Open.—On cars equipped with Stromberg Model UU-2 carburetors, low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever thus holding the auxiliary needle valve open. To correct, set the auxiliary control lever cam so that there is approximately 1/16″ clearance between the cam and the auxiliary control lever. Also, check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works free.

Lack of Power

A lack of power on early model Pierce-Arrow cars equipped with chain front end drives may be caused by the chain jumping a sprocket tooth and throwing the timing out. If the car owner complains of a lack of power, check to see that the valve and ignition timing are correct.

OIL PRESSURE

The following oil pressure data is given for a motor that has been thoroughly warmed up and the oil is hot.

Model and year	Min.	Max.
80—1925-26-27	1 lb idling	25 lbs. at 40 M.P.H.
33—1925-26	5 lbs. at 20 M P H.	30 lbs. at 45 M.P.H.
36—1927-28	on peg idling 5 lbs at 20 M.P H.	20 to 25 lbs. at 40 M.P.H.
81—1928	on peg idling 5 lbs at 20 M.P.H	20 to 25 lbs at 40 M.P.H.
133, 143—1929	5 lbs. at 20 M.P.H.	30 lbs. at 40 M.P.H.
C—1930	5 lbs. at 20 M.P.H.	30 lbs. at 40 M.P H.
B—1930.	5 lbs. at 20 M.P.H.	30 lbs at 40 M.P H.
A—1930..	5 lbs. at 20 M.P.H.	30 lbs. at 40 M.P.H.

IGNITION TIMING

Pierce-Arrow Model 80 1925-26-27, 81 1928.—The contact points should just start to separate when No. 1 piston, on compression stroke, is 2¼″ (flywheel travel) past top dead center or when the ignition timing mark on the flywheel rim is at the indicator of the peekhole in the fly-

Ignition Timing Table

The following table contains complete ignition timing data for all models of Pierce-Arrow from 1925 to 1930 inclusive

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
PIERCE-ARROW						
1925-26-27	80	018″-027″	*2¼″A	Ret	030″	1-5-3-6-2-4
1925-26	33	020″-025″	*1¼″A	Ret	030″	1-5-3-6-2-4
1927-28	36	020″-025″	*1⅜″A	Ret	030″	1-5-3-6-2-4
1928	81	020″-025″	*2¼″A	Ret	030″	1-5-3-6-2-4
1929	133, 143	022″	1″B	Adv	028″	1-6-2-5-8-3-7-4
1930	A	022″	*5°B	Adv	028″	1-6-2-5-8-3-7-4
1930	B	022″	*5°B	Adv	028″	1-6-2-5-8-3-7-4
1930	C	022″	*5°B	Adv	028″	1-6-2-5-8-3-7-4

A.—After top dead center. Adv—Spark lever in fully advanced position B—Before top dead center Ret—Spark lever fully retarded

*All models of Pierce-Arrow are provided with flywheel marks for ignition timing.

wheel housing. The spark lever should be in the fully retarded position. (See Ignition Timing Table for contact point gap clearance).

Pierce-Arrow Model 33 1925-26, 36 1927-28.—Dual ignition is used on these models. Each ignition circuit consists of an ignition coil, a set of spark plugs and a set of contact points which is mounted in a double breaker distributor. The contact points toward the rear of the car furnish ignition for the set of spark plugs over the exhaust valve and the other set of contact points furnish ignition for the spark plugs over the intake valves. The ignition is timed so that the set of plugs over the exhaust valves fire from 3° to 9° before the plugs over the intake valves.

The contact points nearest the rear of the car should just start to separate when the ignition timing mark on the flywheel is at the indicator with piston No. 1 on the compression stroke. The spark lever should be in the fully retarded position. The contact points nearest the front of the car should be timed to fire from 3° to 9° later by flywheel travel. (See Ignition Timing Table for contact point gap clearance).

Pierce-Arrow Straight Eight Model 133, 143 1929.—The distributors used on these models have two breaker arms and a four lobe cam. One set of contact points is mounted on a stationary base and the other is mounted on a movable plate. The stationary set of contact points should just start to separate when the ignition timing mark for piston No. 4 is at the indicator of the peekhole in the flywheel housing. With piston No. 4 on compression stroke, the spark lever should be in the fully advanced position. (See Ignition Timing Table for contact point gap clearance).

Complete information on how to synchronize the distributor points will be found under the heading To Synchronize Eight Cylinder Distributor With Four Lobe Cam, below.

Pierce-Arrow Models A 1930, B 1930, C 1930.—The distributors used on these models have two sets of breaker arms and a four lobe cam. One set of breaker arms is mounted on a stationary base and the other set is movable. The stationary set of contacts should just start to separate when the ignition timing mark on the flywheel is at the indicator of the peekhole in the flywheel housing. With piston No. 1 on compression stroke, the spark lever should be in the fully advanced position. (See Ignition Timing Table for contact point gap clearance).

Complete information on how to synchronize the contact points will be found under the heading To Synchronize Eight Cylinder Distributors With Four Lobe Cam.

To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (2 ignition coils used).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other is mounted on a movable plate and arranged to break 45° apart of distributor shaft rotation which is equal to 90° of flywheel travel.

Both sets of contact points should be adjusted to the correct opening as given in the Ignition Timing Table. Use synchronizing tool No. 1835009, Fig. 1, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor shaft in the direction of rotation until the contact points on the stationary plate just open. The instant the contact points open should be determined by the aid of a test ammeter or test lamp connected in series with the primary ignition circuit lead. With the ignition switch turned on, the instant the points open, the ammeter needle will return to zero if an ammeter is used or the lamp will go out if a lamp is used. Hold the distributor shaft exactly in this position and clamp the synchronizing tool to the side of the distributor with one edge of the rotor point directly even with the O° graduation on the edge of the tool.

Next turn the distributor in the direction of rotation until the same edge of the rotor is even with the 90° mark on the scale of the tool. Hold the distributor exactly in this position and adjust

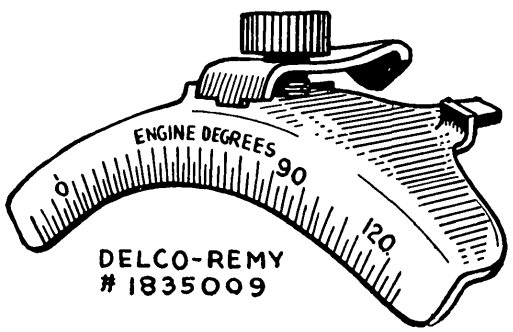


Fig. 1

Delco-Remy synchronizing tool No. 1835009. This tool is used to synchronize the distributor arms on Delco-Remy igniters used on Pierce-Arrow automobiles with two ignition coils. The contact points are set to break 45° apart of distributor shaft rotation which is equivalent to 90° of flywheel travel.

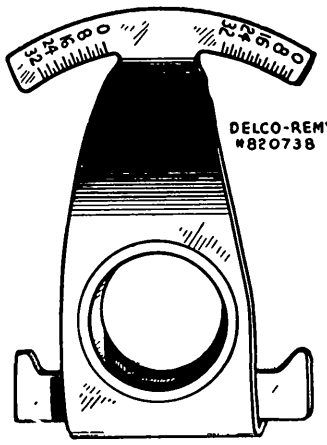


Fig 2 *Delco-Remy synchronizing tool No. 820738 used to synchronize Delco-Remy distributors used on Pierce-Arrow automobiles. The distributor points in these breakers break contact 45 degrees apart distributor shaft rotation which is equal to 90 degrees of flywheel travel*

the movable plate by loosening lock screws over the plate and turning the eccentric screw with a screwdriver until the contact points just start to open.

The above procedure is for a distributor of clockwise rotation. If the distributor is of counter-clockwise rotation, reverse the reading on the scale of the tool.

Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy.

To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (1 ignition coil).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate and arranged to break contact 45° apart distributor shaft rotation which is equal to 90° flywheel travel.

Adjust both sets of contact points to the correct opening as given in the Ignition Timing Table. Use synchronizing tool No. 820738, Fig. 2, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor in the direction of rotation until the contact points on the stationary plate just open. The exact instant that the contact points open should be determined by the aid of a test ammeter or test lamp connected in series with the primary circuit. With the switch turned on, the instant the contact points open will be indicated by the ammeter needle dropping back to zero if an ammeter is used or by the lamp going out if a lamp is used.

Hold the distributor shaft exactly in this position and place the synchronizing tool over the cam. Lock in place with the slide pushed through showing the arrow which points toward the direction of rotation. Scratch a mark on the side of the distributor housing in line with the O° graduation on the side of the tool which points toward the direction the distributor shaft rotates.

Rotate the distributor shaft in the direction of rotation without removing the tool until the O° graduation on the opposite side of the tool is even with the first mark made on the distributor housing. Hold the distributor shaft exactly in this position and adjust the movable plate by loosening the lock screws over the plate and turning the eccentric screw with a screwdriver until the contact points just open. Tighten the screws, check the contact points for correct opening and repeat the entire operation for accuracy.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for all models of Pierce-Arrow from 1925 to 1930 inclusive. Valve clearances are given for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
PIERCE-ARROW								
1925-26-27	80	003″		003″	003″	*T C	Opens	
1925-26	33	003″		003″		†5°B	Opens	
			004″		003″	†5°A		Closes
1927-28	36	003″		003″		†5°B	Opens	..
			004″		003″	†5°A		Closes
1928	81		003″	003″	003″	T C	Opens	.
1929	133, 143		004″	004″	006″	*5°A	Opens	.
1930	A		004″	004″	006″	*5°A	Opens	.
1930	B		004″	004″	006″	*5°A	Opens	..
1930	C		004″	004″	006″	*5°A	Opens	..

A —After top dead center B —Before top dead center T C —Top dead center

*All models of Pierce-Arrow are provided with valve timing marks on the flywheel

†Models 33 and 36 have two camshafts Timing marks are provided on the flywheel rim for timing both the intake and exhaust valves.

Pierce-Arrow Models 80 1925-26-27, 81 1928.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .003″. The intake valve should just start to open when the flywheel timing mark for inlet valves 1 and 6 is at the indicator of the peekhole in the flywheel housing. (See Valve Timing Table for tappet clearance).

Pierce-Arrow Models 33 1925-26, 36 1927-28.—These motors are equipped with "T" type cylinder heads and two camshafts. One camshaft is for intake valves and the other is for exhaust valves. To check the intake valve timing, set the tappet clearance for No. 1 intake valve at .003″. Crank the motor until No. 1 intake valve just starts to open. At this point the flywheel mark for inlet valves 1 and 6 should register with the indicator of the peekhole in the flywheel housing.

To check the exhaust valve timing, set the tappet clearance for No. 1 exhaust valve at .004″, crank the motor until No 1 exhaust valve just closes. At this point, the flywheel valve timing mark for exhaust valves 1 and 6 should just register with the indicator of the peekhole in the flywheel housing. Reset the valve tappet clearance after the timing operation is complete. (See Valve Timing Table for tappet clearances).

Pierce-Arrow Models A 1930, Straight Eight 133, 143 1929, B 1930, C 1930.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .004″. The intake valve should just

start to open when the valve timing mark on the flywheel rim for the intake valves 1 and 6 registers with the indicator of the peekhole in the flywheel housing. Reset the valve tappet clearance after the timing operation is complete. (See Valve Timing Table for tappet clearances).

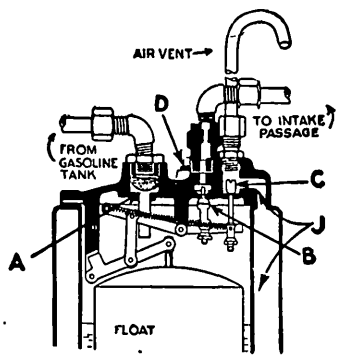


Fig. 3
Cross section view of upper half of vacuum tank showing location of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

GAS LINE SCREENS

All Models of Pierce-Arrow equipped with vacuum tank fuel feed have two gasoline strainers in the gas line from the supply tank to the carburetor. One strainer is located in the top of the vacuum tank, Fig. 3, and the other is located at the carburetor. To clean the strainer in the top of the vacuum tank, disconnect the feed line and remove the elbow and hexagon bushing. Wash the strainer screen in clean gasoline and blow clear with air.

All Models of Pierce-Arrow equipped with pressure type fuel feed had a strainer screen at the carburetor. On cars equipped with a gascolator another strainer screen was located in the gascolator.

All Models of Pierce-Arrow equipped with fuel pump fuel feed have two strainer screens in the gas line from the fuel supply tank to the carburetor. One screen is located in the top of the pump bowl and the other is located at the carburetor. To clean the strainer screen in the top of the fuel pump bowl, Fig. 4, remove the bowl and wash the screen in clean gasoline. When replacing the glass bowl, make sure that the gasket between the pump flange and the glass bowl is in good condition. If the gasket is damaged, replace with a new one.

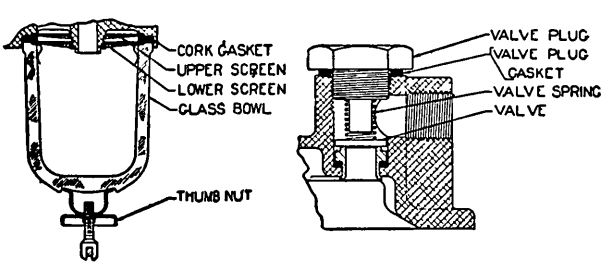


Fig. 4
Cross sectional view of fuel pump, glass bowl and pump valve. Two strainer screens are located in the top of the fuel pump bowl as shown which should be removed and cleaned at intervals. When replacing the bowl, make sure that the cork gasket at the top of the bowl is in good condition and does not leak. Failure of the pump to draw gasoline may be caused by a leak at the pump valve. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVEL

Stromberg Carburetors

Effect of Fuel on Float Level.—When Stromberg carburetors are shipped from the Chicago factory, they are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When higher test (lower specific gravity) 68° to 70° Baumé fuel is used, the float level rises and by bending the float arm the gasoline level can be brought back to normal.

Float level adjustment on Stromberg UU-2 carburetors is especially sensitive to the kind of fuel used. A table of correct float levels for high and low test gasoline will be found on page 70 under Stromberg Carburetors.

Stromberg Model O-3.—The fuel will stand at the correct level in the float bowl when the surface of the fuel is 1″ from the top surface of the float chamber casting, with the motor not running. In the side of the float bowl will be found a sight level hole. The fuel should stand just even with the bottom of the sight level hole.

To readjust the float level, remove the needle valve cap from the top of the float chamber cover and the float needle stem will be seen. Loosen the lock nut and with a wrench on the flat side of the needle sleeve, screw the needle down clockwise until it just seats. Then back it up two turns off its seat. Turning the needle down clockwise should lower the level and turning it up should raise the level. After the adjustment operations are complete, tighten the lock nuts and replace the cap.

Stromberg Model UU-2.—With the motor not running, the fuel level should stand just even with the bottom of the sight level hole in the side of the float chamber casting. If it should become necessary to adjust the float level, bend the float lever arm upward to raise the level and downward to lower the level. The float level should be correct when the top of the float measures 7/32″ from the bottom face of the float chamber cover with the float needle in the seated position.

CARBURETOR SPECIFICATION DIAGNOSIS

The carburetor specification diagnosis information for each Model of Stromberg used on Pierce-Arrow is given under the carburetor heading in the Stromberg section in the back of this book. If trouble is experienced in obtaining a correct carburetor adjustment or in obtaining a correct gasoline mixture from the carburetor, the specification diagnosis section should be consulted.

Specification Tables.—The following tables contain carburetor calibration specification infor-

mation for all Models of Stromberg carburetors used on Pierce-Arrow automobiles.

Pierce-Arrow 81 1927-28
(Stromberg O-3 Engine 3½"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#53–#66
Main Metering Jet	Adjustable	
Economizer Needle Valve (needle lift 5/16")	.....	#56
Main Discharge Jet	.....	‡#A–34, #B–28
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	#33
Accelerating Well Discharge Jet	.....	#53
Venturi	1¼"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #53 wire drill size.

‡First bore of main discharge jet is #34 wire drill; second bore #28 wire drill.

Pierce-Arrow 133, 143, 125, 126 1929
(Stromberg UU-2 Engine 3¼"x4¾")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets (Top one)	.....	#56
Idle Discharge Jets (Lower two)	.....	#56
Main Metering Jet	.046"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-pass Jet	.....	.....
Main Discharge Jet	.....	#30
High Speed Air Bleeder	.....	.....
Pump Reducer	.....	#70
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1⅛"	.....

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
PIERCE-ARROW				PIERCE-ARROW	
1925	80	Own	6	3½"x5 "	1 1/16"
1925	33	Own	6	4 "x5½"	2 "
1926	80	Own	6	3½"x5 "	1 1/16"
1926	33	Own	6	4 "x5½"	2 "
1927	80	Own	6	3½"x5 "	1 1/16"
1927	36	Own	6	4 "x5½"	2 "
1928	36	Own	6	4 "x5 "	2 "
					STROMBERG
1928	81	Own	6	3½"x5 "	O-3
1929	133, 143 125, 126	Own	8	3½"x4¾"	UU-2
1930	C	Own	8	3⅜"x4¾"	UU-2
1930	B	Own	8	3½"x4¾"	UU-2
1930	A	Own	8	3½"x5 "	UU-2

ADJUSTMENT PRECAUTIONS

In nearly every case where trouble is experienced in obtaining a correct carburetor adjustment on a Pierce-Arrow automobile, it will be found that some other unit has not been properly adjusted.

In order to obtain maximum power and efficiency from a Pierce-Arrow motor, the timing should be set by flywheel mark. See that the distributor contact points are clean and properly synchronized and that the spark plug points are properly adjusted.

Effect of Intake Manifold on Carburetor Adjustment.—Present day fuels contain heavy fractions which separate from the more volatile ends and deposit in liquid form on the walls inside the manifold and are held there by the rush of mixture toward the cylinders. This is especially true when making an adjustment from a rich to a leaner mixture. From 10 to 15 seconds time should be allowed between each movement of the adjusting screw in order to allow sufficient time for the fuel adhering to the walls of the manifold to pass into the motor. If sufficient time is not allowed between each movement of the adjusting screw, the motor performance will gradually improve during the adjustment operation and then suddenly die.

Effect of Vacuum on Idle Adjustment.—A poor idling condition on deceleration may be caused by a high vacuum in the manifold above the throttle on Pierce-Arrow cars equipped with Stromberg Model UU-2. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to load and Roll will be noticed. In extreme cases the motor may even die on deceleration. The car owner generally complains that the motor dies in traffic.

To correct the trouble, drill a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat opposite the idle discharge opening.

Caution: The throttle valve should never be drilled unless the trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass jet.

STROMBERG O-3

This carburetor has a gasoline feed above the throttle with separate adjustment for idling the motor; an accelerating well which gives an extra supply of fuel just for a moment as the throttle is opened; and an economizer which permits the carburetor to operate on a very lean mixture at closed throttle position of average driving but automatically shifts to the needed richer setting when the full power of the motor is called for.

Carburetor Adjustment.—Complete adjustment information for Stromberg Model O-3 carburetors used on Pierce-Arrow automobiles will be found in the Stromberg section in the back of this book under the heading of Stromberg Model O.

STROMBERG UU-2

The Stromberg UU series of carburetors are of the dual type having the same float mechanism, venturis, main discharge jets and idling systems as the Model OO-2 but carry the accelerating pump and economizer of the Model U series. A needle adjustment is supplied to control the pump action, its setting ranging from one-half turn open in the summer to three turns open in the winter. Plug type metering jets of the Model U series are employed.

Carburetor Adjustment.—Complete adjustment information for Model UU-2 carburetors will be found in the Stromberg Section in the back of this book under the carburetor heading.

Pontiac 1925-30

Motor Tune-Up

On Pontiac motors equipped with Marvel carburetors, if trouble is experienced in obtaining good motor performance after the ignition timing, valve timing, etc., have been checked, inspect the carburetor air valve spring to see that it is not weak or defective. Inspection Instructions will be found in the Carburetor Specification Diagnosis section. It should be borne in mind, however, when adjusting the carburetor that a correct carburetor adjustment cannot be obtained unless the motor is thoroughly warmed up and the compression in all cylinders is good.

Immediately following the tune-up operations will be found special information pertaining to motor tune-up. These recommendations should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check ignition timing; adjust if necessary.
3. Adjust valve tappets and free up valves.
4. Clean gas line strainers and screens; also check gas lines for loose fittings.
5. Check fan and generator belts; adjust if necessary.

   Note: A plain V type belt should be used. The corrugated or the link type belt may cause a severe knocking sound at road speeds. When adjusting the fan and generator belt, care should be exercised not to get it too tight. A tight belt will cause the generator bushings to wear rapidly.
6. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
7. Check heat control valve.
8. Check throttle valve for opening.
9. Check choke valve for position.
10. Check manifold gasket; see that all manifold flange nuts are tight.
11. Check high tension wiring.
12. Adjust carburetor.
13. Road test car.

    Note: The ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Ignition Timing.—The most important tune-up operation on a Pontiac motor is the ignition timing and spark plug point settings. When a condition of poor idle is encountered, check to see that the ignition is correctly timed and that the contact points are clean and square and the spark plug points correctly set. Symptoms of these conditions are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds. To correct this trouble retime the motor and set the spark plug and contact points to the correct clearances. (See Ignition Timing Table).

Carburetor Air Valve.—A poor idling condition may be caused by the air valve piston sticking. This air valve piston is located in the air valve adjusting screw and operates against the air valve spring. The trouble is generally indicated by the fact that it is difficult to obtain a correct adjustment; also movement of the air valve adjusting screw does not have the proper effect on the air valve action.

To correct a condition of sticking air valves, remove the carburetor from the car and thoroughly clean. Polish the valve with any good grade of metal polish. Do not use sandpaper or any rough abrasive under any consideration. The inside of the air valve adjusting screw should be perfectly smooth and the clearance between the plunger and shell should not exceed .006".

Warped Carburetor Flange.—A ragged idling condition may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly.

When this trouble is encountered, the carburetor should be removed from the manifold and the mounting flanges should be checked with a straightedge to see that they are perfectly square. If they are found to be out of true, square up with a flat mill file.

Soft gaskets should be used between the carburetor and manifold flanges and when bolting the carburetor to the intake manifold, extreme care should be exercised to see that both sides are drawn up evenly.

Lack of Power

Timing.—Lack of power may be caused by incorrect valve or ignition timing. When this trouble is encountered, check both the valve and ignition timing. (See Valve and Ignition Timing sections for timing information).

Low Gasoline Mileage

Air Valve.—A condition of low gasoline mileage may be caused by improper action of the carburetor air valve. Complete information will be found under Ragged Idle.

Motor Cutting Out On Pull

Weak Coil and Condenser.—Late Models of Pontiac are equipped with high speed, high compression motors and considerable strain is placed upon the coil and condenser especially if spark plug gaps are not properly adjusted. If difficulty is experienced by the motor cutting out on a pull, check to see that the spark plug points are properly adjusted and that the ignition coil is not weak, or that the condenser is not defective.

Motor Noise

Exhaust Flange Packing Ring.—A confusing noise in the motor may be caused by a loose exhaust flange packing ring even though the flange appears to be tight. When repacking the flange be sure to slide the metal packing ring out; insert

the packing first and then move the packing ring in against the packing. Next, bolt the exhaust pipe flange to the manifold. Draw it up evenly and make sure that it is tight.

OIL PRESSURE

Model and year	Min	Max.
Six—1926-27	5 lbs.	30 lbs.
6-28—1928	5 lbs.	30 lbs.
6-29—1929	5 lbs	30 lbs
Six—1930	5 to 10 lbs	30 to 40 lbs.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing information for all models of Pontiac from 1926 to 1930 inclusive

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
PONTIAC						
1926-27	Six	020″-024″	*7°B	Automatic	022″	1-5-3-6-2-4
1928	6-28	020″-024″	*7°B	Automatic	022″	1-5-3-6-2-4
1929	6-29	020″-024″	*4°B	Automatic	022′	1-5-3-6-2-4
1930	6-30	020″-024″	*4°B	Automatic	022″	1-5-3-6-2-4

B —Before top dead center
*All Pontiac flywheels are stamped with ignition timing marks

Pontiac All Models 1926-30.—The contact points should just start to separate when the flywheel mark IGN 1-6 is under the indicator of the peekhole in the flywheel housing with piston No. 1 on compression stroke. All Pontiac flywheels are stamped with an ignition timing mark. The distributors are of the full automatic type (see Ignition Timing Table for contact point clearances).

VALVE TIMING

Valve Timing Table

The following table contains complete timing data for Pontiac, all models from 1926 to 1930 inclusive. All valve tappet clearances are given for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
PONTIAC								
1926-27	Six		008″	008″	008″	T C		Closes
1928	6-28		008″	008″	008″	T C		Closes
1929	6-29		008″	008″	008″	7°A		Closes
1930	6-30		008″	008″	008″	7°A		Closes

A —After top dead center T C —Top dead center

Pontiac Six 1926-27, 6-28 1928.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008″. The exhaust valve should just close when No. 1 piston is at top dead center of the exhaust stroke. (See Valve Timing Table for valve tappet clearance).

Pontiac 6-29 1929, 6-30 1930.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008″. The exhaust valve should just close when the flywheel mark indicating top dead center for pistons Nos. 1 and 6 is approximately 2½ flywheel teeth past the indicator of the peekhole in the flywheel housing. (See Valve Timing Table for valve tappet clearance).

GAS LINE SCREENS

All Models of Pontiac equipped with vacuum tank fuel feed have two strainer screens in the gasoline feed system. One screen is located in the top of the vacuum tank and the other screen is located at the carburetor. To clean the gas line screen in the top of the vacuum tank, Fig. 1, disconnect the feed line from the gasoline tank and remove the elbow and bushing. Clean the gas line screen in clear gasoline and blow dry with air.

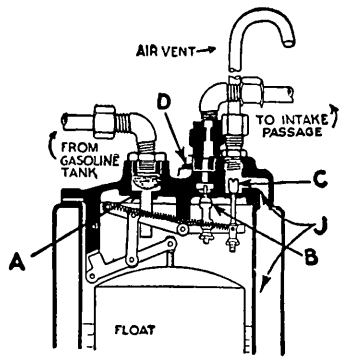


Fig. 1

Upper half of vacuum tank showing position of gas line screens To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

All Models of Pontiac equipped with fuel pump feed have two strainer screens in the gasoline fuel system from the supply tank to the carburetor. One screen is located in the top of the bowl of the fuel pump and the other screen is located at the carburetor. To clean the fuel pump screen, Fig. 2, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into position. If the gasket is damaged, replace with a new gasket.

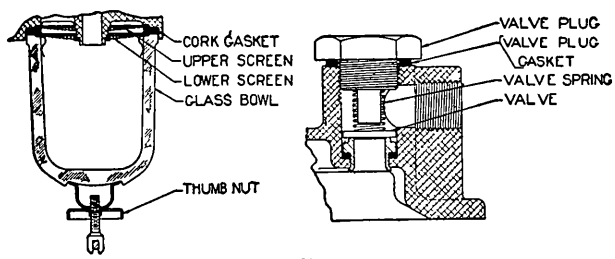


Fig. 2

Cross sectional view of fuel pump glass bowl and pump valve. Two strainer screens are located in the top of the glass bowl and should be removed and washed clean in clear gasoline at intervals If the gasket at the top of the glass bowl is damaged in any way, when the glass bowl is removed, replace with a new one. The valve disc is held in position by a spring which in turn is held in place by the valve plug If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVEL

Two makes of carburetors have been used on Pontiac from 1926 to 1930 inclusive. On the early 1926, 1927 and 1928 models, Carter carburetors were used. On the late 1928, 1929 and 1930 models, Marvel carburetors have been used. The following paragraphs contain complete float level information for both makes of carburetors arranged under the make of the carburetor.

Carter Carburetors

Carter Model DRO.—The fuel in the float bowl will stand at the correct level when the top of the float is 9/16″ from the top surface of the float bowl casting with the float needle valve closed. This measurement should be taken on the side of the float opposite the gasoline intake needle. To adjust the float, bend the float lever lip that comes in contact with the gasoline intake needle up to lower the level and down to raise the level.

Carter Model DRJHO.—The fuel level adjustment for this model of Carter is the same as that for Carter Model DRO. (See paragraphs above).

Marvel Carburetors

Marvel Models A2S, A3S and AA3S.—The fuel will stand at the correct level in the float bowl when the distance measured from the top edge of the float bowl to the top of the float is 11/32″. The measurement should be taken at a point on the float farthest away from the float valve. To adjust the float level, bend the float lever arm.

CARBURETOR SPECIFICATION DIAGNOSIS

Carter and Marvel carburetors have been used on Pontiac automobiles from 1926 to 1930 inclusive. Jet specification information for each model of carburetor, used on Pontiac, will be found in this section under the carburetor model heading.

CARTER CARBURETORS

The jet specifications for all models of Pontiac equipped with Carter carburetors are arranged in tables below by carburetor model rather than car model. To find the jet specifications for any particular model of Pontiac, determine the model of carburetor by either referring to the table of Motor Specifications under Carburetor Adjustment or by examining the name plate of the carburetor. Then by referring to the tables of specifications below, the correct calibration specifications of the carburetor can be determined.

Carter Model DRO (Pontiac Six 1926).—This carburetor is a multiple jet, plain tube carburetor with adjustments for both high and low speeds. Maximum economy is obtained at approximately 20 miles per hour and minimum at wide open throttle.

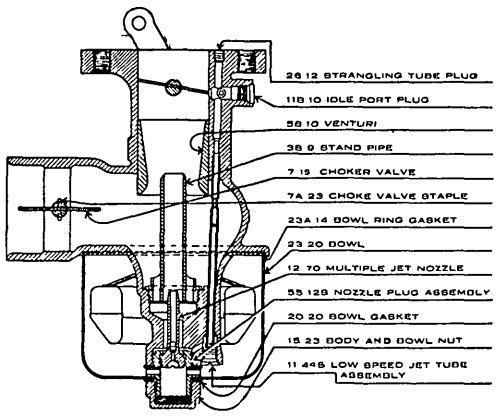

26 12 STRANGLING TUBE PLUG
118 10 IDLE PORT PLUG
56 10 VENTURI
36 9 STAND PIPE
7 15 CHOKER VALVE
7A 23 CHOKE VALVE STAPLE
23A 14 BOWL RING GASKET
23 20 BOWL
12 70 MULTIPLE JET NOZZLE
55 129 NOZZLE PLUG ASSEMBLY
20 20 BOWL GASKET
15 23 BODY AND BOWL NUT
11 446 LOW SPEED JET TUBE ASSEMBLY

Fig. 3
Cross sectional view of Carter DRO used on Pontiac automobiles showing the idling system and multiple jet nozzles.

The low speed jet assembly supplies gasoline to the motor at idle engine speed and up to approximately 15 miles per hour, gasoline flowing through a drilled passage connecting the low speed jet chamber with the carburetor well. At idle speed, gasoline is drawn through low speed jets and idling ports at the edge of the throttle valve. The idle adjusting screw regulates the amount of air entering this port. Backing out the adjusting screw admits more air and consequently makes the idle mixture leaner.

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber (see Fig. 3). The high speed adjusting needle supplies gasoline to the carburetor well; from this well a combination of gasoline and air is drawn into the nozzle chamber through accelerating jets on the side of the nozzle intermingling with fuel from the vertical jet, the combination forming a fine spray which is carried by the standpipe to the venturi, or a main air passage where it is absorbed by incoming air forming a mixture on which the engine operates. Jets on the side of the nozzle coming into operation in direct proportion to the throttle position. The further the throttle is opened, the more jets are in operation. At wide open throttle, all jets are working and the engine is getting maximum supply.

Carburetor Specifications
(Carter Model DRO)

Make of Engine: Pontiac. No. cylinders, 6. Four cycle.
Carburetor Model: DR-O. Size 1 inch. Finish: Rust-proofed body, brass bowl.
Size Main Venturi: 49/64 inch. Upper well depth from standpipe seat: 3/8 inch.
Lower Well Diameter: 5/16 inch. Standpipe: Round nose top 5/16 inch I. D.; four No. 30 air holes.
Low Speed Jet: No. 69 drill. By-pass: No. 48 drill. Economizer: No. 56 drill.
Float Level: Top of float to be 9/16 inch from casting shelf.
Idle Port Opening Above Valve with Valve Tight Closed: .047 inch to .051 inch.
Idle Port Length: .130 inch. Width: .040 inch.
Type of Idle: Air bleed.
Nozzle: Diagonal jet: None. Vertical jet: No. 71 drill. Top jet: No. 38 drill.

Accelerating Jets:	Number	Drill Size	Distance from Top of Tube
(Combination No. 35)	1	44	¼ inch
	1	65	½ inch
	1	38	13/16 inch

High Speed Needle Seat: No. 56 drill.

Throttle Lever: Location: Right side. Type: Stamped steel. Length of lever: 1 7/32 inch. In center of travel: Lever points up. To close throttle, move lever from you.

Choker: Location of valve: In carburetor air intake. Type: Butterfly. Choker lever on left side. In open position: Points toward you. To close choker, move lever up.

Gasoline Intake Needle: Standard. Needle seat: Standard.

Gasoline Line: Size ¼ inch. Type of connection: S.A.E.

Strainer Cap: Angled. Points away from you and 20 degrees out from center line of air intake.

Remarks: Recommended setting for idle adjustment screw: One-half to one full turn. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded. Recommended setting for high speed needle: One and one-eighth to one and three-eighths turns open.

Carter Model DRJHO.—The principle of operation of this model of Carter used on Pontiac is practically the same as the model DRO described above with the exception that these later models are equipped with an accelerating pump and an economizer operated by the throttle valve. (See Fig. 4).

This model of carburetor is a multiple jet plain tube carburetor with adjustments for both high and low speeds. Maximum economy is obtained at approximately 20 miles per hour and minimum at wide open throttle.

The low speed jet assembly supplies gasoline to the motor at idle engine speed and up to approximately 18 miles per hour, gasoline flowing through a drilled passage connecting the low speed jet chamber with the carburetor well. At idle, gasoline is drawn through the low speed jet and idling port at the edge of the throttle, Fig. 4. The idle adjusting screw regulates the amount of air entering this port. Backing out the adjusting screw admits more air and consequently makes the idling mixture leaner.

The vertical jet in the base of the multiple jet nozzle feeds gasoline direct to the nozzle chamber. The high speed adjusting needle supplies gasoline to the carburetor well. From this well a combination of gasoline and air is drawn into the nozzle chamber through the accelerating jets on the side of the nozzle intermingling with the fuel from the vertical jet. The combination forming a fine spray which is carried by the standpipe to the venturi or main air passage where it is absorbed by incoming air, forming a mixture on which the engine operates. The jets on the side of the nozzle come into operation in direct proportion to the throttle position. The further the throttle is opened the more jets are in operation until at wide open throttle all jets are working and the engine is getting the maximum supply of fuel.

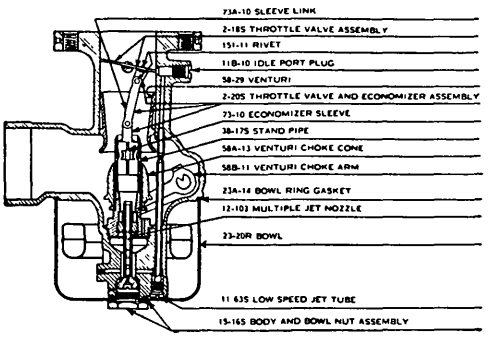


Fig. 4

Cross sectional view of Carter Model DRJHO used on Pontiac automobiles. This carburetor is equipped with an economizer sleeve which is operated by the throttle valve inside of the standpipe.

The economizer consists of a sleeve valve which functions the inside of the standpipe and controls a series of ports in the standpipe below the venturi. The economizer is operated by the throttle valve and is arranged to admit additional air to the primary mixture at part throttle or usual driving conditions giving a lean mixture for these speeds. At higher speeds, when the throttle is fully opened, the air holes are closed off thus causing a richer mixture to pass into the motor. A cross section view of the economizer device is illustrated in Fig. 4.

The accelerating pump is of the plunger type and is mounted on the outside of the carburetor attached to the carburetor body just above the bowl. The pump plunger is operated by the throttle valve so that when the throttle is suddenly opened, an extra charge of gasoline is forced into the venturi.

Carburetor Specifications

(Carter Model DRJHO-104S)

Three different carburetor assemblies of the Carter Model DRJHO were used on Pontiac in 1927 and 1928. The following tables contain complete specifications for each carburetor assembly arranged under the carburetor model and assembly number.

Carter Carburetor DRJHO-104S.—The following table contains carburetor specifications for Carter carburetor used on Pontiac Six 1926-27. To read, hold carburetor air intake from you.

Make of Engine: Pontiac. No. cylinders: 6. Four cycle.

Carburetor Model: DRJHO. Size 1 inch. Finish: Duco body, brass bowl.

Size Main Venturi: 13/16 inch. Upper well depth from standpipe seat: ⅜ inch. Lower well diameter: 11/32 inch.

Standpipe: Round nose top 7/16 inch I.D.; with 5/16 inch venturi. One No. 51 air hole. Two air slots .189 to .192 high by .233 to .236 wide. Four No. 40 cross holes ½ inch from top.

Economizer Sleeve: Double action. Cross holes ½ to ¾ open at closed throttle.

Low Speed Jet: No. 75 drill. By-pass: No. 53 drill. Economizer: No. 56 drill.

Float Level: Top of float to be 9/16 inch from machined surface of casting.

Accelerating Pump: Air bleed through plunger shaft No. 75 drill.

Idle Port Opening Above Valve with Valve Tight Closed: .041 inch to .045 inch.

Idle Port Length: .130 inch. Width: .040 inch.

Type of Idle: Air bleed.

Nozzle: Diagonal jet: None. Vertical jet: No. 70 drill. Top jet: No. 30 drill.

Accelerating Jets:	Number	Drill Size	Distance from Top of Tube
(Combination No. 41)	1	53	5/8 inch
	1	60	25/32 inch
	1	60	1 inch
	1	50	1 5/32 inch
	1	38	1 11/32 inch

High Speed Needle Seat: No. 56 drill.

Throttle Lever: Location: Right side. Type: Stamped steel. Length of lever, 1 7/32 inch. In center of range lever points up. To close throttle, move lever from you.

Choker: Location in venturi. Type: Cone. Choker lever on left side. In open position: Points down. To close choker, move lever from you.

Gasoline Intake Needle: Square vertical. Needle seat: Standard vertical.

Gasoline Line: Size 1/4 inch. Type of connection: S.A.E.

Strainer Cap: Angled. Points away from you and 20 degrees out from center line of air intake.

Remarks: Recommended setting for idle adjustment screw: One-half to one full turn. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded. Recommended setting for high speed needle: One and one-eighth to one and five-eighths turns open.

Carburetor Specifications

(Carter Model DRJHO-101S)

Carter Model DRJHO-101S.—The following carburetor specifications were issued in January and used on early Pontiac 1928 models. To read, hold carburetor air intake from you.

Make of Engine: Pontiac. No. cylinders: 6. Four cycle.

Carburetor Model: DRJHO. Size 1 inch. Finish: Duco body, brass bowl.

Size Main Venturi: 27/32 inch. Upper well depth from standpipe seat: 3/8 inch.

Lower Well Diameter: 5/16 inch. Standpipe: Round nose top 7/16 inch I.D., with 5/16 inch venturi. One No. 51 air hole. Two air slots .189 to .192 high by .233 to .236 wide. Four No. 40 cross holes 1/2 inch from top.

Economizer Sleeve: Double action cross holes 1/2 to 3/4 open at closed throttle.

Low Speed Jet: *No. 75 drill. By-pass: No. 53 drill.* Economizer: No. 56 drill.

Float Level: Top of float to be 9/16 inch from casting shelf.

Idle Port Opening Above Valve with Valve Tight Closed: .041 inch to .045 inch.

Idle Port Length: .130 inch. Width: .040 inch.

Type of Idle: Air bleed.

Nozzle: Diagonal jet: None. Vertical jet: No. 65 drill. Top jet: No. 30 drill.

Accelerating Jets:	Number	Drill Size	Distance from Top of Tube
(Combination No. 47)	1	53	5/8 inch
	1	60	25/32 inch
	1	60	1 inch
	1	50	1 5/32 inch
	1	38	1 11/32 inch

High Speed Needle Seat: No. 56 drill.

Throttle Levers: Two, one adjusting, one free. Type: Stamped steel. Location: Left side. Length: Adjusting lever, 1 7/32 inch. Free lever, 2 1/2 inch. In center of range adjusting lever points up. To close throttle, move lever from you.

Choker: Location in venturi. Type: Cone. Choker lever on left side In open position: Points up. To close choker, move lever from you.

Gasoline Intake Needle: Square vertical. Needle seat: Vertical with No. 48 needle seat hole.

Gasoline Line: Size 1/4 inch. Type of connection: S.A.E.

Strainer Cap: Straight. Points toward you.

Remarks: Recommended setting for idle adjustment screw: One-half to one full turn. To make mixture richer: Turn adjustment screw in. Do not idle engine *below 300 R.P.M. with spark retarded. Recommended* setting for high speed needle: One and one-eighth to one and five-eighths turns open.

Carburetor Specifications

(Carter Model DRJHO-109S)

Carter Model DRJHO-109S.—The following Carter carburetor specifications were issued in April and were used on late 1928 Pontiac cars. To read, hold carburetor air intake from you.

Make of Engine: Pontiac. No. cylinders: 6. Four cycle.

Carburetor Model: DRJHO. Size 1 inch. Finish: Duco body, brass bowl.

Size Main Venturi: 27/32 inch. Upper well depth from standpipe seat: 3/8 inch. Lower well diameter: 11/32 inch.

Standpipe: Round nose top 7/16 inch I.D., with 5/16 inch venturi. One No. 51 air hole. Two air slots .189 to .192 high by .233 to .236 wide. Four No. 40 cross holes 1/2 inch from top.

Economizer Sleeve: Double action. Cross holes 1/2 to 3/4 open at closed throttle.

Low Speed Jet: No. 75 drill. By-pass: No. 53 drill. Economizer: No. 56 drill.

Float Level: Top of float to be 9/16 inch from machined surface of casting.

Accelerating Pump: Air bleed through plunger shaft No. 75 drill.

Idle Port Opening Above Valve with Valve Tight Closed: .041 inch to .045 inch.

Idle Port Length: .130 inch. Width: .040 inch.

Type of Idle: Air bleed.

Nozzle: Diagonal jet: None. Vertical jet: No. 65 drill. Top jet: No. 30 drill.

Accelerating Jets:	Number	Drill Size	Distance from Top of Tube
(Combination No. 47)	1	53	5/8 inch
	1	60	25/32 inch
	1	60	1 inch
	1	50	1 5/32 inch
	1	38	1 11/32 inch

High Speed Needle Seat: No. 56 drill.

Throttle Levers: Two, one adjusting, one free. Type: Stamped steel. Location: Left side. Length: Adjusting lever, 1 7/32 inch. Free lever, 2 1/2 inch. In center of range adjusting lever points up. To close throttle, move lever from you.

Choker: Location in venturi. Type: Cone. Choker lever on left side. In open position: Points down. To close choker, move lever from you.

Gasoline Intake Needle: Square vertical. Needle seat: Vertical with No. 48 needle seat hole.

Gasoline Line: Size 1/4 inch. Type of connection: S.A.E.

Gasoline Connection: S.A.E. elbow. Points toward you.

Remarks: Recommended setting for idle adjustment screw: One-half to one full turn. To make mixture richer: Turn adjustment screw in. Do not idle engine below 300 R.P.M. with spark retarded. Recommended setting for high speed needle: One and one-eighth to one and five-eighths turns open.

MARVEL CARBURETORS

Marvel carburetors were used as equipment on Pontiac Models 1928-29-30. The carburetor comprises a main body or mixing chamber and a float chamber bowl with a fuel strainer at the point of entrance of fuel to the bowl. Within the mixing chamber are two jets which supply the amount of gasoline used in the mixture. One of these called the low speed is situated in a small venturi and the other called the high speed is situated under the top of the automatic air valve. (See Fig. 5). These jets are both of the fixed opening and non-adjustable. The air valve is of the hinged type and is connected by a rod to a plunger which moves in the air adjusting screw shell. The function of the plunger in this dash pot is to stabilize the action of the air valve and prevent its too rapid motion. Inside the plunger and air screw is an air valve spring which regulates the pressure on the air valve and thus controls the flow of fuel from the jets.

A further automatic control of the mixture is provided by the economizer which is a metering pin connected to the throttle lever which provides for a maximum power fuel supply at wide open throttle and the minimum fuel consumption at all normal driving speeds at part open throttle. The economizer remains in action on level road driving up to approximately 50 miles per hour and is entirely automatic and requires no adjustment.

Also connected to the throttle and built in with the economizer is the accelerating device. On quick opening of the throttle, a definite increased charge of fuel is forced from the high speed jet to provide for quick pick-up. On top of the fuel bowl will be found a small lever pointing to "Summer" or "Winter." This provides for a maximum amount of accelerating charge for cold weather when set on "Winter" and a decreased amount for warm weather when set on "Summer," thus insuring maximum pick-up under the two extremes of weather conditions. This is not an adjustment but a seasonal control only and it has nothing to do with the fuel supplied by the jets other than the charge supplied on quick opening only of the throttle.

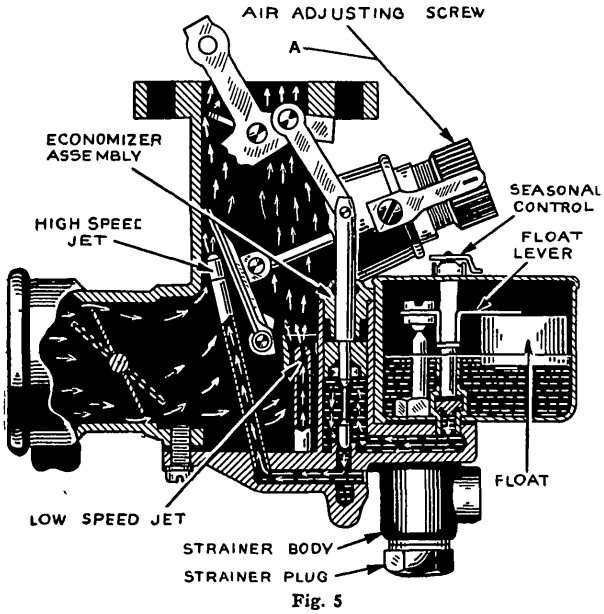


Fig. 5

Cross sectional view of Marvel carburetor used on Pontiac automobiles. These carburetors are of the two nozzle type and are equipped with an economizer assembly as shown in the illustration.

The jet specifications for Marvel carburetors used on Pontiac are determined by flow meter measurements. These carburetors are correctly calibrated at the factory and are not intended to be changed. The specification diagnosis consists mainly of inspecting parts for wear.

Specification Diagnosis
(Marvel Carburetors)

The specification diagnosis information for all Models of Pontiac equipped with Marvel are the same as those for Oakland, with the exception that on the late Models of Oakland three nozzle type carburetors were used. For complete specification diagnosis information, see pages 256 to 257.

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, dismantle, thoroughly clean and inspect all jets and passageways as described under Inspection Instructions page 256.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
PONTIAC					CARTER
1926	Six	Own	6	3¼″x3¾″	DRO-46 1″
1927	Six	Own	6	3¼″x3¾″	DRJHO-104S 1″
1928	6-28	Own	6	3¼″x3¾″	DRJHO-101S, 109S 1″
					MARVEL
1928	6-28	Own	6	3¼″x3¾″	A2S 1″
1929	6-29	Own	6	3 5/16″x3⅞″	A3S 1¼″
1930	Six	Own	6	3 5/16″x3⅞″	AA3S 1¼″

ADJUSTMENT PRECAUTIONS

The adjustment precaution information for Pontiac automobiles is the same as that for Oakland and will be found on page 257 of the Oakland section.

MARVEL CARBURETORS
(Models A-2-S, A-3-S, and AA-3-S)

The adjustment information for all Models of Marvel used on Pontiac automobiles is the same as that for Marvel Model A-2-S on page 257 of the Oakland section.

Information covering the economizer and accelerating device will also be found in this section (page 258).

Reo 1925-30

Motor Tune-Up

When tuning a Reo motor, the mechanic should keep constantly in mind that there are certain conditions of trouble which may develop in the ignition system that are very similar to and may be confused with carburetor troubles. Special care should be exercised to see that the ignition timing, valve timing, contact point and spark plug gap clearances are correct.

Immediately following the tune-up operations and in the carburetor adjustment section under Adjustment Precautions will be found special information pertaining to motor tune-up and carburetor adjustment. This information should be closely observed when tuning the motor.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
3. Synchronize distributor points.
   Note: The above operation is necessary only on those models having distributors with two sets of breaker contacts.
4. Check the ignition timing; adjust if necessary.
   Note: Check to see that the distributor rotates freely in its mounting and moves through the full range of advance or retard.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; also check gas line for loose fittings.
7. Check fan belt; adjust if necessary.
8. Tighten water pump nut. This operation is only necessary when packing gland is leaking.
9. Adjust carburetor; clean if necessary.
   Note: If car owner complains of difficulty with hard starting or of a condition similar to a lack of gasoline, check for water in the bowl of the carburetor.
10. Road test car.
    Note: On all Reo Mate cars the ignition should be set so that a slight ping is heard on fast acceleration. On all Reo Flying Cloud models, the ignition should never be advanced beyond a point where a spark knock occurs except under full load conditions.

Ragged Idle

Ignition Timing not Properly Synchronized.—Of all the motor tune-up operations for Reo, the most critical is ignition timing, spark plug and contact point settings. Those models equipped with distributors having double breaker arms should be carefully and accurately synchronized. If the points are not properly synchronized, the motor will run rough. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speeds.

To correct this trouble synchronize the points as described under ignition timing.

Spark Plug Point Setting.—On all late models of Reo, a poor idling condition may be caused by a too wide spark plug gap setting: The spark plug gap should not be set to a distance greater than .025″ (see Ignition Timing Table).

Sprung Carburetor Diaphragm.—On all models of Reo automobiles, equipped with Johnson carburetors, a condition of poor idling may be caused by a sprung carburetor diaphragm. (See Fig. 4).

A condition of sprung diaphragm can be checked out in the following manner. Procure a .006″ feeler gauge and if the diaphragm is sprung, the feeler gauge can be inserted between the diaphragm and the carburetor body at a point on the rear side of the carburetor next to the motor crankcase. This condition can only be corrected with a new diaphragm unit.

Hard Starting

Fulcrum Rod Sticking (Schebler Carburetors).—A condition of hard starting may be caused by the fulcrum rod on Schebler S carburetors sticking. This condition results in too lean a mixture from the air valve being held open.

Poor Acceleration

Throttle Valve Fails to Open.—A condition of poor acceleration may be caused by the throttle valve rod bending, thus resulting in a partial throttle opening. The rod in question is the link between the carburetor butterfly lever and the bell crank on the clutch housing. To correct this trouble, replace this light rod with a ¼″ rod.

Motor Loading on a Pull

High Float Level.—On cars equipped with Schebler carburetors loading on a pull may be caused by a high float level. To correct this trouble, lower the float level by bending the float lever arm. (See Float Level Adjustment).

Lack of Power

Failure of Ignition Timing Advance Control.—On those models of Reo (Mate 1927-28, at this time called the Wolverine) equipped with a button dash control for the advance, manipulated through a wire, a condition of lack of power may be caused by the control failing to properly advance the distributor. This condition may be corrected by installing a regular choke wire which is heavier than the original wire installed in the car.

Motor Misfiring

Spark Plug Point Adjustment.—A cutting out of the motor on a pull may be caused by improper spark plug point clearance. The spark plug points should not be adjusted to less than .020″ nor more than .025″.

OIL PRESSURE

Model and year	Min	Max.
T 6—1925	No gauge	.....
Six—1926	No gauge	
Flying Cloud—1927-28-29	8 lbs	50 lbs
Wolverine—1928	10 lbs	50 lbs
Flying Cloud Master—1929	8 lbs	50 lbs
Flying Cloud Mate—1929	5 lbs.	40 lbs.
15—1930	10 lbs.	50 lbs.
20, 25—1930	8 lbs.	50 lbs.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing data for all Models of Reo from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
REO						
1925	T-6	020″	6″B	Adv	020″	1-4-2-6-3-5
1926	T-6	020″	6″B	Adv	020″	1-4-2-6-3-5
1927-28	Flying Cloud	018″-024″	1″A	Ret	025″	1-5-3-6-2-4
1928	Wolverine	020″	T C	Ret	025″	1-5-3-6-2-4
1929	Flying Cloud Master	018″-024″	1″A	Ret	025″	1-5-3-6-2-4
1929	Flying Cloud Mate	020″	½″B	Adv	025″	1-5-3-6-2-4
1930	15	020″	½″B	Adv	025″	1-5-3-6-2-4
1930	20 25	018″-024″	1¼″B	Ret	025″	1-5-3-6-2-4

A —After top dead center B —Before top dead center Adv —Spark lever in fully advanced position Ret —Spark lever in fully retarded position

Reo T-6 1925-26.—The contact points should just start to separate when piston No. 1 is 6″ (flywheel travel) before top dead center of the compression stroke. The spark lever should be in the fully advanced position. Recheck the ignition timing with the spark lever in the fully retarded position. With the spark lever fully retarded, the contact points should just start to separate when the flywheel mark UPDC is from ½″ to 1½″ past the indicator in the flywheel housing. If the contact points separate at top dead center or before the spark control linkage should be inspected and all lost motion and play eliminated. Do not change the advance setting.

The indicator for the flywheel mark is the top edge on the right hand sub-frame member. (See Ignition Timing Table for contact point clearance).

Flying Cloud 1927-28, Master 1929.—The contact points should just start to separate when piston No. 1 is 1 (flywheel travel) past top dead center of the compression stroke. The spark lever should be set in the fully retarded position. (See Ignition Timing Table for contact point clearance.)

Reo Wolverine 1928.—The contact point should just start to separate when piston No. 1 is at top dead center of the compression stroke with the spark control in the fully retarded position. (See Ignition Timing table for contact point clearance).

Reo Flying Cloud Mate 1929, Model 15 1930.—The contact points should just start to separate when piston No. 1 is ½″ (flywheel travel) before top dead center of the compression stroke with the spark lever in the fully advanced position. (See Ignition Timing Table for contact point clearance).

Reo Model 20, 25 1930.—The contact points should just start to separate when piston No. 1 is 1¼″ (flywheel travel) before top dead center of the compression stroke with the spark control in the fully retarded position. (See Ignition Timing Table for contact point clearance).

To Synchronize Six Cylinder Distributors with Six Lobe Cam.—This distributor has two sets of contact points and a six lobe cam. The contact points should be synchronized to open simultaneously.

Connect a test lamp across each set of contact points and adjust until both lamps go out simultaneously when the contact points are opened.

VALVE TIMING

Reo Model T-6 1925-26.—To check the valve timing set the tappet clearance for No. 1 intake valve at .005″. The intake valve should just start to open when piston No. 1 is at top dead center of the exhaust stroke. On Models T-6 that are equipped with semi-automatic spark advance the valve timing should be set so that the intake valve opens ½″ (flywheel travel) before top dead center of the compression stroke. The indicator for checking valve timing by flywheel travel is the top edge of the right sub-frame member. (See Valve Timing Table for valve tappet clearances).

Reo Flying Cloud 1927-28, Flying Cloud Master 1929.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .004″. The intake valve should just start to open when piston No. 1 is at top dead center of the exhaust stroke. (See Valve Timing Table for tappet clearances).

Valve Timing Table

The following table contains valve timing data for all Models of Reo from 1925 to 1930 inclusive. All tappet adjustments are made with hot motor unless otherwise designated

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running				
		Int.	Exh.	Int.	Exh.	Piston Travel	Int. Valve	Exh. Valve
REO								
1925	T-6	005″		004″	006″	T C	Opens	
1926	T-6	005″		004″	006″	T C	Opens	
1927-28	Flying Cloud	004″		004″	006″	T C	Opens	
1928	Wolverine	008″		004″	006″	125″A	Opens	
1929	Flying Cloud Master	004″		004″	006″	T C	Opens	
	After motor No 22490			007″	008″	T C	Opens	
1929	Flying Cloud Mate	005″		005″	007″	T C	Opens	
1930	15	007″		007″	007″	T C	Opens	
1930	20, 25	007″		007″	008″	T C	Opens	

A —After top dead center T C —Top dead center

Reo Wolverine 1928.—To check the valve timing, set the tappet clearance for No. 1 intake valve at .008". The intake valve should just start to open when No. 1 piston is .125" (piston travel) after top dead center of the exhaust stroke.

TIMING CHAIN ADJUSTMENT

Reo Flying Cloud 1927-28, Flying Cloud Master 1929 and Models 15, 20 and 25 1930.—The generator is supported by a bolt at the bottom and two bolts at the top of the bracket. To tighten the chain, loosen the two upper support bolts and move the generator away from the motor. The chain adjustment should never be made with the motor running. Adjust the timing chain slack to a point just below the point where the chain hums. If the chain is tightened too tight, there is danger of damaging the bearings of the generator and camshaft.

Wolverine 1928, Flying Cloud Mate 1929.—The generator is supported by a bolt at the bottom and a bolt at the top of the generator bracket and is provided with an adjusting screw. On these models the timing chain should be adjusted with engine running. To tighten the chain, loosen the generator support bolt nuts, release the adjusting screw lock nut and tighten the adjusting screw until the chain hums, then loosen the screw until the hum disappears.

GAS LINE SCREENS

All Models of Reo equipped with vacuum tank fuel feed have two strainer screens in the gas line from the supply tank to the carburetor. One screen is located in the top of the vacuum tank, Fig. 1, and the other screen is located at the carburetor. To clean the screen in the top of the vacuum tank, remove the gas feed line and screw out the hexagon bushing together with the strainer screen. Wash in clean gasoline and blow clear with air.

All Models of Reo equipped with fuel pump feed have two strainer screens in the gas line from the supply tank to the carburetor. One screen is located in the fuel pump and the other is located at the carburetor. To clean the strainer screen at the fuel pump, remove the glass bowl, Fig. 2, and wash the strainer screen in clear gasoline. When replacing the fuel pump bowl, care should be exercised to see that the cork gasket at the top of the bowl is in good condition and does not leak. If the gasket has been damaged in any way, replace with a new gasket.

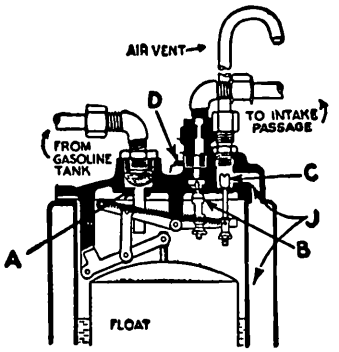


Fig. 1

Upper half of vacuum tank showing location of gas line screens To clean, disconnect the feed line from the gasoline tank and remove the hexagon bushing. Wash the strainer screen in clean gasoline and blow clear with air.

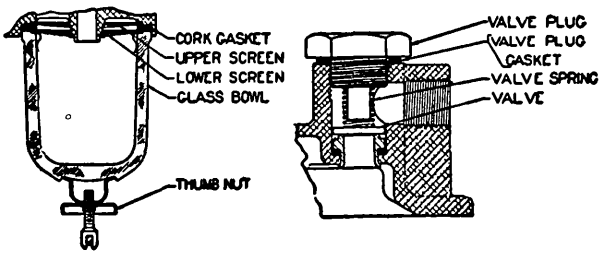


Fig. 2

Cross section view of fuel pump, glass bowl and pump valve Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVEL

The following paragraphs contain float level measurements for all carburetors used on Reo automobiles from 1925 to 1930 inclusive.

Johnson Carburetors

Johnson Model R.—The fuel level will be correct in the carburetor bowl when the lower base of the float is 1¼" below the machined flange of the carburetor body or diaphragm with the float bowl gasket removed and the float in the raised position. This dimension should be uniform for the entire circumference of the float.

To adjust the float level, bend the brass float support up or down until the desired measurement is obtained.

Schebler Carburetors

With our present day fuels, float level adjustment has become an important factor and should be done with care. The following paragraphs contain complete float level adjustment information for all models of Schebler carburetors used on Reo automobiles.

Schebler Model S-1½", Die Cast.—The fuel will stand at the correct level in the float bowl when the float is from ⅛" to 5/32" from the carburetor body with the float valve seated.

If it should be necessary to change the float level, bend the float lever arm.

Schebler Model S-1¼", S-1½", Brass Bowl.—The fuel will stand at the correct level in the float bowl when the distance from the top of the float to the top of the bowl casting measures 5/32" with the float valve seated.

If it should become necessary to change the float level adjustment, bend the float lever arm.

Schebler Model UX-1½".—The fuel will stand at the correct level in the float bowl when the float lever arm stands parallel with the flange of the

carburetor body with the needle valve in the closed position.

If it should become necessary to change the float level adjustment, bend the float lever arm.

CARBURETOR SPECIFICATION DIAGNOSIS

The following paragraphs contain carburetor specifications for Johnson and Schebler carburetors used on Reo automobiles.

JOHNSON CARBURETORS

Johnson carburetors used on Reo cars are of the plain air valve type provided with an economizer, accelerating pump, and an interconnected throttle and choke. The fuel mixture is controlled chiefly by the action of an automatic air valve which takes care of the carburetor through its full range of operation. Each carburetor is correctly calibrated at the factory, therefore the jet specification information consists chiefly of inspecting the carburetor for dirty or plugged up passageways and openings and worn parts.

Occasionally jobs will be encountered where someone unfamiliar with Johnson carburetors has tampered with the calibration specifications by drilling out the economizer tube or by changing or stretching the air valve spring. Under no consideration should these parts be changed or tampered with in any way.

Inspection Instructions

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, thoroughly wash and clean in gasoline and inspect as follows:

Warped Carburetor Body Flanges.—Inspect the milled surfaces of the upper and lower body flanges where the two halves of the carburetor are bolted together to see that these flanges are not warped or distorted in any way.

If the upper body flanges are warped, it may distort the air valve seat, causing a leak at the air valve and thus throw the carburetor adjustment out of balance.

Warped or distorted body flanges may be checked by the use of a feeler gauge inserted between the upper and lower halves of the body before the carburetor is dismantled or by using a straightedge on the face of the flange after the lower half of the body has been removed. To correct this trouble, replace the carburetor body.

Air Valve Spring.—The air valve spring (5), Fig. 3, is a calibrated part and should not be stretched or tampered with in any way. Weak air valve springs will be most noticeable at high speeds, causing a lean mixture. If when the carburetor is overhauled or dismantled for cleaning there is any doubt as to the condition of the air valve spring, it should be replaced with a new part.

Economizer Tube.—The purpose of the economizer is to admit an air stream into the middle of the gasoline flow for economy. The economizer tube (6) Fig. 3 and (48) Fig. 4 admits air into a drilled passageway leading to the chamber lying between the spray needle seat (52) Fig. 4 and the main discharge jet (51). At this point the air is mixed with the gasoline stream flowing upward through the jets. The economizer is open at idle and all throttle positions and car speeds up to approximately 55 miles per hour. As the engine speed increases, the rate of air flow increases more rapidly than does the rate of gasoline flow, gradually bringing about a leaner condition, requiring that the air leaks through the economizer be stopped, thus transferring the vacuum directly to the high speed spray jets for open throttle conditions. At higher speeds or when additional power is required at low speeds the opening motion of the throttle lever produces a rotation of the throttle valve cross shaft and causes the economizer lever and cap (6) Fig. 3, floating on this shaft to rotate by means of a coiled spring to a position such that the cap closes the opening in the upper end of the economizer tube. Additional opening of the throttle does not further affect the action of the economizer.

Jobs may be encountered where someone unfamiliar with Johnson carburetors has drilled out the economizer tube opening, which is a calibrated part. On the base of each economizer tube stamped on the hexagon nut portion a number will be found, which corresponds to the wire drill size of the tube. If trouble is experienced with the motor loading or difficulty is encountered when attempting an adjustment, check to see that the opening of the economizer tube corresponds with the drill size stamped on the base of the tube.

Air Valve.—The air valve should be inspected for wear and loose hinges. When the motor is not running, the air valve is closed, but when the motor is in operation, the air valve is continually off its seat and operates automatically to supply the requirements of the engine. If the hinges are excessively worn or loose, the air valve may not operate accurately and thus upset the balance of the carburetor.

Stabilizer Pistons.—The automatic air valve is stabilized by a dash pot consisting of a brass piston operated in a well of gasoline. The piston is connected to the air valve by a plunger rod (11) Fig. 3. The lower end of the stabilizer well is closed and the well is kept filled with gasoline by a drilled hole leading from the float chamber. The piston fits loosely in the dash pot and permits gasoline to flow slowly from above the plate to below and vice versa. The action of the piston in the gasoline filled well provides a retarding force preventing fluttering of the air valve particularly on open throttle and low speeds.

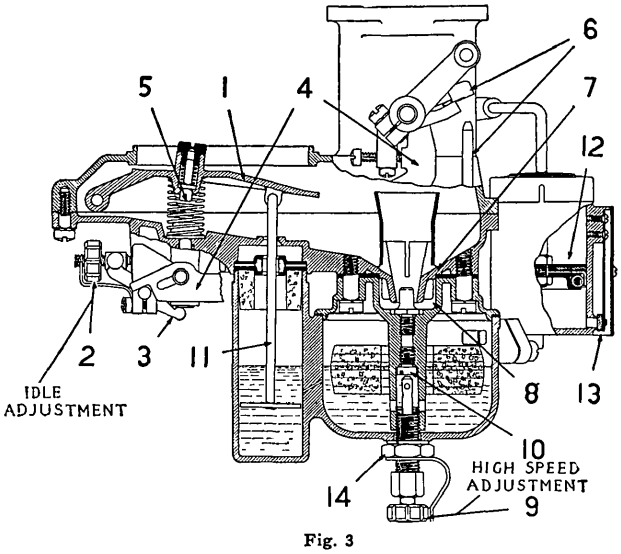


Fig. 3

Cross section view of Johnson Model R carburetor used on Reo automobiles. As shown in the illustration, the stabilizer piston assembly is mounted outside of the float bowl. This carburetor has two adjustments as shown. The idle adjustment (2) which controls the air valve and the high speed adjustment (9) which controls the gasoline admitted to the main discharge nozzle. The accelerating pump is automatically controlled by a thermostat as shown at (13).

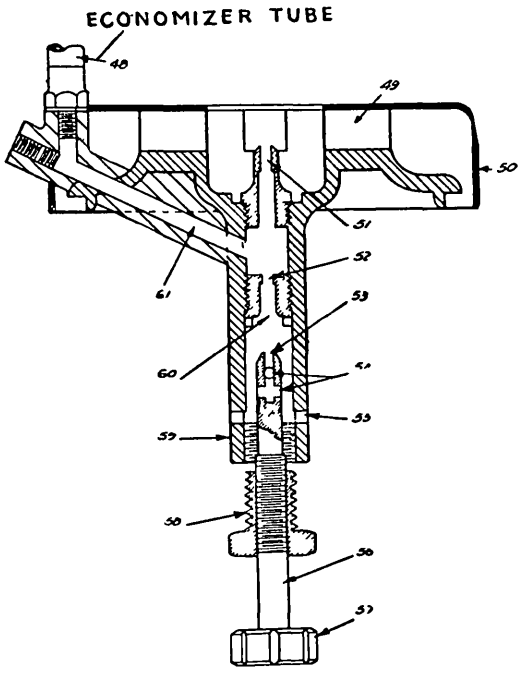


Fig 4

Cross section view of Johnson Model R carburetor diaphragm used on Reo automobiles As shown at (48) the economizer tube bleeds air to the main discharge nozzle The air enters the mixture at a point between the high speed needle valve seat (52) and the main discharge nozzle (51) through the passage (61)

When the carburetor is dismantled for any purpose, the stabilizer piston assembly and washer should be inspected to see that they are in good condition

Accelerating Pump.—The accelerating pump is an integral part of the carburetor and is located on the side of the carburetor body The pump is in effect a single acting air pump in which a leather piston expanded by a coil spring and supported by suitable washers is actuated by a plunger rod connected to a lever mounted on the throttle valve cross shaft The piston slides in the cylinder, which is open to the atmosphere at the top and connected to an air passage leading into the upper part of the float chamber bowl

Air is forced on the downward stroke of the pump into the air space at the top of the float chamber Under normal conditions the pressure on the gasoline in the float bowl is atmospheric, due to the leakage of air through the air bleed This pressure is increased temporarily whenever the plunger in the pump is quickly forced down by quickly opening the throttle The action of the increased pressure in the float chamber causes a sudden increase of the rate at which the gasoline is forced to the nozzle slightly ahead of the air stream through the automatic air valve When the throttle is opened slowly, the air in the pump is forced out through the air bleed instead of into the float chamber so that the accelerating pump does not have any effect upon the mixture

On Model R carburetors, a thermostat control (13), Fig 3, is used to regulate the action of the accelerating pump according to temperature conditions This device provides a hole leading out of the lower end of the accelerating pump chamber, bleeding the air which otherwise would be forced into the float chamber This hole is automatically opened and closed by a felt button attached to the lower end on a thermostatically controlled arm The action is such that the button uncovers the hole as the operating temperature rises and closes it when the temperature is low

If trouble is experienced on acceleration with cars equipped with Johnson Model R carburetors, check to see that the accelerating pump thermostat is working correctly If the thermostat is found to be defective, replace with a new unit

SCHEBLER CARBURETORS

Two types of Schebler carburetors have been used on Reo automobiles From 1925 to 1930 Schebler Model S was used In 1930 Schebler Model S and Schebler UX carburetors have been used

The principle of operation of both types of carburetors is practically the same However, the carburetors vary slightly in design Complete information on the principle of operation and carburetor specification, diagnosis will be found in the Schebler section under the carburetor model heading in the back of this book

Specification Tables.—The following tables contain Schebler calibration specifications for only those parts that are most likely to be at fault if a correct carburetor adjustment cannot be obtained If trouble is experienced in obtaining a correct carburetor adjustment, turn to the Schebler Carburetor Specification Diagnosis section in the Schebler section in the back of this book The following specification tables are arranged by car model

Reo 20, 25 1930

(Schebler UX 1¼" Engine 3⅜"x 5")

Description of part	Part No or size
Air Valve Spring	*49-M
Needle Valve complete	†#10
Accel Pump Cross Passage	‡#50
Accel Pump Cylinder	#12

*The dimensions of the air valve springs are as follows No of coils 11 length 3⅛", wire gauge 14

†The needle assembly number is indicated by the number of rings machined on the needle body

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #50 passage is the same size as a #50 wire drill The size of the passage is stamped on the side of the body of the passage

Reo T-6 1925

(Schebler S-1¼" Engine 3 3/16"x 5")

Description of part	Part No or size
Air Valve Spring	*16 48-D
Needle Valve complete	† #5
Accel Pump Cross Passage	‡#52
Accel Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows No of coils 10 length 2" to 2 9/16", wire gauge 16

†The needle assembly number is indicated by the number of rings machined on the needle body

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #52 passage is the same size as a #52 wire drill The size of the passage is stamped on the side of the body of the passage

Reo Six 1926

(Schebler S 1¼" Engine 3¾"x 5")

Description of part	Part No or size
Air Valve Spring	*16-48-U
Needle Valve complete	†# 1
Accel Pump Cross Passage	‡#50
Accel Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows No of coils 10½, length 2⅜" to 3⅛", wire gauge 15

†The needle assembly number is indicated by the number of rings machined on the needle body

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes A #50 passage is the same size as a #50 wire drill The size of the passage is stamped on the side of the body of the passage

Reo Flying Cloud 1927

(Schebler S-1 1/2" Engine 3 1/4"x 5")

Description of part	Part No. or size
Air Valve Spring	*16-48-U
Needle Valve complete	†#10
Accel. Pump Cross Passage	‡#54
Accel. Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows: No. of coils: 10 1/2; length: 2 5/8" to 3 1/8"; wire gauge: 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #54 passage is the same size as a #54 wire drill. The size of the passage is stamped on the side of the body of the passage.

Reo Wolverine 1928

(Schebler S-1 1/4" Engine Cont. 15E 3 1/4"x 4")

Description of part	Part No. or size
Air Valve Spring	*16-48-U
Needle Valve complete	†# 1
Accel. Pump Cross Passage	‡#54
Accel. Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows: No. of coils: 10 1/2; length: 2 5/8" to 3 1/8"; wire gauge: 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #54 passage is the same size as a #54 wire drill. The size of the passage is stamped on the side of the body of the passage.

Reo Flying Cloud 1928

(Schebler S-1 1/2" Engine 3 1/4"x 5")

Description of part	Part No. or size
Air Valve Spring	*16-48-U
Needle Valve complete	†#10
Accel. Pump Cross Passage	‡#52
Accel. Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows: No. of coils: 10 1/2; length: 2 5/8" to 3 1/8"; wire gauge: 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #52 passage is the same size as a #52 wire drill. The size of the passage is stamped on the side of the body of the passage.

Reo Flying Cloud 1929

(Schebler S-1 1/4" Engine Cont. 16E 3 1/4"x 4")

Description of part	Part No. or size
Air Valve Spring	*16-48-U
Needle Valve complete	†# 4
Accel. Pump Cross Passage	‡#54
Accel. Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows: No. of coils: 10 1/2; length: 2 5/8" to 3 1/8"; wire gauge: 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #54 passage is the same size as a #54 wire drill. The size of the passage is stamped on the side of the body of the passage.

Reo Flying Cloud Master 1929

(Schebler S-1 1/2" Engine 3 3/8"x 5")

Description of part	Part No. or size
Air Valve Spring	*16-48-U
Needle Valve complete	†# 7
Accel. Pump Cross Passage	‡#52
Accel. Pump Cylinder	# 4

*The dimensions of the air valve springs are as follows: No. of coils: 10 1/2; length: 2 5/8" to 3 1/8"; wire gauge: 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #52 passage is the same size as a #52 wire drill. The size of the passage is stamped on the side of the body of the passage.

Reo 15 1930

(Schebler U-1 1/4" Engine Cont. 15E 3 1/4"x 4")

Description of part	Part No. or size
Air Valve Spring	*16-49-I
Needle Valve complete	†#10
Accel. Pump Cross Passage	‡#50
Accel. Pump Cylinder	#12

*The dimensions of the air valve springs are as follows: No. of coils: 9; length: 2 1/4"; wire gauge: 14.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #50 passage is the same size as a #50 wire drill. The size of the passage is stamped on the side of the body of the passage.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
REO					JOHNSON
1928	Flying Cloud	Own	6	3 1/4"x5"	R-1 1/2"
					SCHEBLER
1925	T 6	Own	6	3 1/8"x5"	S 1 1/4"
1926	Six	Own	6	3 3/4"x5"	S 1 1/4"
1927	Flying Cloud	Own	6	3 1/4"x5"	S 1 1/2"
1928	Wolverine	Cont. 15E	6	3 1/4"x4"	S 1 1/4"
1928	Flying Cloud	Own	6	3 1/4"x5"	S 1 1/2"
1929	Flying Cloud	Cont. 16E	6	3 3/8"x4"	S 1 1/4"
1929	Flying Cld. Mas.	Own	6	3 3/8"x5"	S 1 1/4"
1930	15	Cont. 15E	6	3 1/4"x4"	U 1 1/4"
1930	20, 25	Own	6	3 3/8"x5"	UX 1 1/2"

ADJUSTMENT PRECAUTIONS

Low Speed Adjustment on Schebler Model S Carburetors.—On Model S Schebler carburetors used on Reo cars, difficulty with the low speed adjustment may be experienced by the stop screw at the bottom of the needle valve seat not permitting a wide enough range of adjustment. There is danger of a mechanic not familiar with this condition, stripping the adjusting gears by turning the adjustment too far one way or the other. If after turning the low speed adjustment several notches one way or the other, a distinct resistance is felt against the movement of the adjusting screw, do not force it. If it should be necessary to get a wider range of adjustment, remove the carburetor bowl and remove the stop screw at the bottom of the needle valve seat. Replace the bowl, adjust the carburetor, then remove the bowl again and replace the screw.

On some of the early models of Reo equipped with Schebler Model S carburetors no stop was provided on the idle adjustment so that caution should be exercised not to screw the adjustment out of gear. By turning the idle adjustment screw more than 30 or 40 notches either to the right or to the left there is danger that the vertical gear will drop away from the adjusting screw gear which would necessitate dismantling the carburetor.

This trouble can be checked by depressing the air valve and holding a small light in such a posi-

tion that the gears can be seen through the air valve opening while turning the adjusting screw either to the right or the left.

Effect of Leaky Bowl on Adjustment.—On all Model U Schebler carburetors, a correct adjustment cannot be obtained unless the gasoline bowl is absolutely tight against the body flange. If the bowl has been removed for any reason, a new bowl gasket should be used and checked for leaks.

A condition of leaky bowl is generally evidenced by an erratic condition when attempting to adjust the carburetor. It will be impossible to obtain a stable adjustment.

Effect of Intake Manifold on Carburetor Adjustment.—Present day fuels contain heavy fractions which separate from the more volatile ends and deposit in liquid form on the walls inside the manifold and are held there by the rush of mixture toward the cylinders. Especially is this true when making an adjustment from a rich to a leaner mixture. At least from 10 to 15 seconds time should be allowed between each movement of the adjusting screw to permit the fuel that has accumulated in the manifold to pass into the motor. This is especially true when making a range adjustment on Schebler Model U carburetors. Insufficient time allowance between each movement of the adjusting screw is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. This is especially true of the idle and range adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the points where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

JOHNSON MODEL R

The adjustment procedure for Johnson Model R carburetors used on Reo automobiles is given in the following paragraphs. Two adjustments are provided on these carburetors. One, the air valve or idle adjustment which controls the action of the air valve and the other the high speed or gasoline adjustment which controls the operation of the carburetor at high speeds.

High Speed Adjustment.—After the motor has been thoroughly warmed up, set the hand throttle so that the motor is running at approximately 30 miles per hour. Screw in the high speed adjustment (9), Fig. 3, until the motor runs rough from a lean mixture and then back off the adjustment until the motor just smooths out.

Next gradually retard the throttle until the motor slows down to idling speed and make the idle adjustment.

Idle Adjustment.—With the motor thoroughly warmed up, and running at idling speed, screw the idle adjustment (2), Fig. 3, out until the motor runs rough from a lean mixture; then screw the air valve adjustment in until the motor just smooths out. This adjustment should be made with the stop screw on the throttle set at a point where the motor will not die. After the idling adjustment is complete, reset the throttle stop screw to the desired idling speed.

SCHEBLER CARBURETORS

Two series of Schebler carburetors—the Model S and U—have been used on Reo automobiles from 1925 to 1930 inclusive. Both series of carburetors are very similar in the principle of operation and are of the air valve type.

Schebler Model S-1¼" and S-1½".—The Model S is an air valve carburetor having two air inlets. The fixed air opening is through the venturi and is very small, furnishing barely enough air to enable the engine to idle slowly. Due to the small opening through the venturi, the velocity of the air passing through it is very high even when the engine is idling. This enables it to pick up the gasoline at the nozzle and atomize it thoroughly. Due to the venturi suction on the gasoline at the nozzle, it is quite strong, making it possible to control the mixture very accurately and to get positive and reliable action at low speeds.

The auxiliary air valve is closed for idling and wide open for full power. It is very large, making it possible to handle large amounts of air at the smallest suction.

Complete adjustment and carburetor diagnosis information for Schebler Model S carburetors will be found in the Schebler section under the heading of the carburetor in the back of this book.

Schebler Model U-1¼" and UX-1½".—The Model U Schebler carburetor used on Reo is very similar in operation to Schebler Model S described above. Complete information on the principle of operation and factory adjustment will be found in the Schebler section under the model heading of the carburetor in the back of this book.

Studebaker 1925-30

Motor Tune-Up

On all models of Studebaker automobiles, when tuning the motor, extreme care should be exercised to see that the ignition and valve timing is correct. On models equipped with double breaker arm distributors make sure that the contact arms are properly and correctly synchronized.

Following the tune-up operations will be found special information covering motor tune-up which should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack; adjust if necessary.
   Note: This operation applies only to those models equipped with a chain front end drive.
3. Synchronize distributor points.
   Note: This operation applies only to those models equipped with distributors having two breaker arms.
4. Check the ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
   Note: On some of the six cylinder models it will be necessary to remove the carburetor in order to get the valve plate out.
6. Clean gas line strainers and screens; also check gas lines for loose fittings.
7. Check fan and generator belts; adjust if necessary.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Check heat control valve.
   Note: This operation applies only to those models equipped with manifold heat control.
10. Check throttle valve for opening.
11. Check choke valve for position.
12. Check manifold gaskets; see that all manifold flange nuts are tight.
13. Adjust carburetor; clean if necessary.
    Note: If difficulty is experienced in obtaining a correct adjustment the carburetor should be removed from the car and thoroughly cleaned. If the car owner complains of motor failing on a hill by cutting out and missing, check for water in the carburetor.
14. Road test car.
    Note: If after the car has been driven from 6000 to 8000 miles a spark knock occurs, the cylinder head should be removed and the carbon scraped out. If the combustion chamber is free of carbon, the ignition should not knock except under full load conditions.

Ragged Idle

Choke Valve.—A poor idling condition on Studebaker models may be caused by the choke valve being partially closed. Check to see that the choke valve is in the correct position when the choke button is pushed into the dash.

Warped Carburetor Flange.—Failure of the motor to idle may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Extreme care should be exercised when bolting the carburetor to the intake manifold to see that both sides come up evenly.

The carburetor should be checked with a straightedge to see that it is perfectly square. If it is found to be out of true, square up with a flat mill file. Never use a hard gasket between the carburetor and manifold flanges.

Warped Carburetor Body (Schebler Model S Die Cast).—A poor idling condition may be caused by a leak at the joint between the upper and lower halves of the carburetor body. To check for this trouble, use a feeler gauge and insert same at the joint between the upper and lower halves of the carburetor. If there is any clearance at this joint the carburetor should be removed from the manifold, dismantled and the halves of the carburetor trued up by means of a piece of plate glass and valve grinding compound.

Throttle Shaft Bushing Lost (Stromberg UU-2).—A poor idling condition may be caused by the throttle shaft bushing on the opposite side of the carburetor from the control rod working loose and falling out. When this trouble occurs, it will be necessary to replace the throttle shaft and both throttle shaft bushings.

Butterfly Valve Improperly Synchronized.—A poor idling condition may be caused by improperly synchronized butterfly valves on a Model UU Stromberg carburetor due to the fact that the screws through the butterfly valves have worked loose, thus allowing the valves to slip out of position, causing one valve to close before the other. When this trouble occurs, it may result in causing the butterfly valve cap to become bent.

To check for this trouble, remove the carburetor from the intake manifold and check the throttle closing with a .0015" feeler gauge. If the throttle valves are found to be out, readjust the throttle valve position and tighten the throttle valve screws. As a precaution against the throttle valve screws working loose, a drop of solder should be placed on the heads of the screws.

Poor Acceleration

Pump Piston Working Loose.—On all models of Studebaker equipped with Stromberg Models U and UU-2 carburetors poor acceleration may be caused as a result of the pump piston working loose. When this trouble occurs, dismantle the carburetor and reassemble the pump piston into position.

Dirty Main Metering Jets.—Poor acceleration may be caused by a dirty main metering jet on those cars equipped with Stromberg carburetors. To correct this trouble, remove the carburetor from the intake manifold, dismantle and thor-

oughly clean all jets and passageways. The carburetor should be washed in clean gasoline and blown dry with air.

Carburetor.—Poor acceleration may be caused by an improper carburetor adjustment. Two makes of carburetors have been used on Studebaker automobiles; namely: Stromberg and Schebler. On cars equipped with Model T carburetors, poor acceleration may be caused by the accelerating well air bleeders being plugged up or too large.

Another condition which affects motor performance at idle on acceleration and at speeds is the working loose of the main discharge jets on cars equipped with Stromberg T. This trouble is generally caused by the influence of heat on the two metals composing the body member and the main discharge jet proper. The jet works loose and vibration causes it to work down in the threads until a leak occurs. Motor performance is affected through the whole speed range.

Poor Gasoline Mileage

Poor gasoline mileage and motor performance may be the result of improper or faulty carburetor adjustment, especially on those cars equipped with Schebler carburetors. Before attempting a carburetor adjustment, the special precautions found in the carburetor adjustment section should be consulted.

On cars equipped with Stromberg carburetors, low gasoline mileage may be caused by the auxiliary control needle not seating properly. Check to see that the choke control does not hold this needle off its seat.

Main Discharge Jet (Stromberg T).—Low gasoline mileage on cars equipped with Stromberg Model T carburetors may be caused by the main discharge jet working loose. (See Carburetor under Poor Acceleration above).

OIL PRESSURE

Model and year	Min.	Max.
Big Six—1925-26-27	1-2 lbs.	4-5 lbs.
Standard—1925-26-27	1-2 lbs.	4-5 lbs.
Special—1925-26-27 .	1-2 lbs.	4-5 lbs.
President—1928 .	.20 lbs.	60 lbs.
Dictator—1928	12 lbs.	40 lbs.
Commander—1928 .	10 lbs.	40 lbs.
Dictator Six—1929-30	20 lbs. at 30 M.P.H.	
Dictator Eight—1929-30 .	30 lbs. at 30 M.P.H.	
Commander Six—1929.	20 lbs. at 30 M.P.H.	
Commander Eight—1929-30	20 lbs at 30 M.P.H.	
President Eight—1929-30 .	33 lbs. at 30 M.P.H.	

IGNITION TIMING

Studebaker Big and Special Six 1925-26-27, Standard Six 1925-26-27.—The contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke. The spark lever should be in full retard position. (See Ignition Timing Table for contact point clearance).

Studebaker President Eight 1928.—The distributors used on these models have two breaker arms and a four lobe cam. One set of breaker arms is mounted on a fixed plate and the other set is mounted on a movable plate. To time the distributor to the motor, the stationary contacts should just start to separate when piston No. 1 is at top dead center of the compression stroke. The spark control lever should be in full advance position. (See Ignition Timing Table for contact point clearance).

Complete information on how to synchronize the contact arms is given under the heading To Synchronize Eight Cylinder Distributors With Four Lobe Cam below.

Studebaker Dictator Six 1928-29-30, Commander Six 1928-29.—The contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke, the spark control lever should be set at ½ advance. (See Ignition Timing Table for contact point clearance).

Studebaker Dictator Eight 1929-30, Commander Eight 1929-30, President Eight 1929-30.—The distributors used on these models have two sets of breaker arms and a four lobe cam. One set of contact points is mounted in a fixed position and the other set is mounted on a movable plate. To time the distributor to the motor, the stationary set of contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke. The spark lever should be in 2/3 advance position. (See Ignition Timing Table for contact point clearance).

Complete information on how to synchronize the distributor arms will be found below under the heading To Synchronize Eight Cylinder Distributors With Four Lobe Cam.

Ignition Timing Table

The following table contains complete ignition timing data for all Models of Studebaker from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
STUDEBAKER						
1925-26-27	Big Six .	* .020"-.025"	T C.	Ret	.025"	1-5-3-6-2-4
1925-26-27	Standard	.020"-.025"	T.C.	Ret	.025"	1-4-2-6-3-5
1925-26-27	Special Six	* .020"-.025"	T.C.	Ret	.025"	1-5-3-6-2-4
1928	President 8	.022"	T C.	Adv	.027"	1-6-2-5-8-3-7-4
1928	Dictator 6 .	.020"-.025"	T C	½ Adv	.025"	1-4-2-6-3-5
1928	Commander 6	.020"-.025"	T C	½ Adv	.025"	1-5-3-6-2-4
1929-30	Dictator 6	.020"-.024"	T.C.	½ Adv	.025"	1-4-2-6-3-5
1929-30	Dictator 8	.022"	T C	⅔ Adv	.025"	1-6-2-5-8-3-7-4
1929	Commander 6	.020"-.024"	T C	½ Adv	.025"	1-4-2-6-3-5
1929-30	Commander 8	.022"	T C.	⅔ Adv	.025"	1-6-2-5-8-3-7-4
1929-30	President 8	.022"	T C	⅔ Adv.	.025"	1-6-2-5-8-3-7-4

Adv—Spark lever fully advanced. Ret.—Spark lever fully retarded T C—Top dead center.

*Big and Special Six 1926-27 equipped with Delco-Remy distributors set contact point gap at .028"

To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (one ignition coil).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set on a movable plate and arranged to break contact 45 degrees apart, distributor shaft rotation, which is equal to 90 degrees of flywheel travel. Adjust both sets of contact points within the limits of from .018″ to .024″, preferably .022″. Use synchronizing tool No. 820738, Fig. 1, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor in the direction of rotation until the contact points on the stationary plate just open. The exact instant the contact points open can best be determined by the use of a test ammeter or a lamp connected in series with the primary ignition circuit. With the ignition switch turned on, the instant the points open the ammeter needle will return to zero if an ammeter is used, or the lamp will go out if a test lamp is used.

Hold the distributor shaft exactly in the position of the stationary points just opening and place the synchronizing tool over the cam and lock in place with the slide pushed through showing the arrow which points toward the direction of rotation. Put a scratch mark on the side of the distributor housing in line with the 0° graduation on the side of the tool which points toward the direction the distributor shaft rotates.

Rotate the distributor shaft in the direction of rotation without removing the tool until the zero graduation on the opposite side of the scale is even with the first mark made on the distributor housing. Hold the distributor shaft exactly in this position and adjust the movable set of contacts by loosening the lock screws over the plate and turning the eccentric screw with a screwdriver until the contact points just start to separate. This point should be determined by the use of a test lamp or test ammeter.

Tighten the screws and check the contact points for correct opening. Repeat the entire synchronizing operation for accuracy.

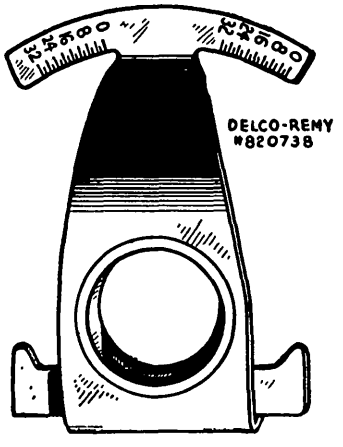


Fig. 1

Delco-Remy synchronizing tool No. 820738. The distributor contact points should be synchronized before timing the distributor to the motor. It should be borne in mind that 45 degrees of distributor shaft rotation is equal to 90 degrees of flywheel travel.

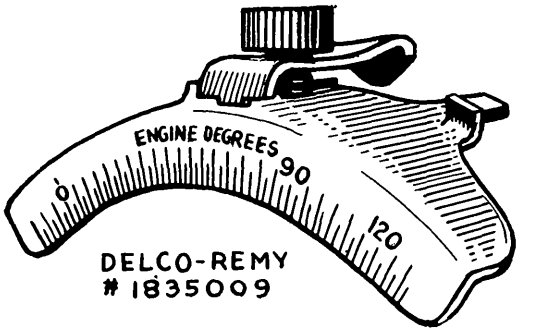


Fig. 2

Delco-Remy synchronizing tool No 1835009. The distributor contact points should be synchronized before timing the distributor to the motor. It should be borne in mind when synchronizing the contact points that 45 degrees of distributor shaft travel is equal to 90 degrees of flywheel travel. If trouble is experienced in obtaining smooth motor performance at idling speed, see that both ignition coils are in good condition and that neither coil is weak.

To Synchronize Delco-Remy Eight Cylinder Distributors With Four Lobe Cam (2 ignition coils).—This distributor has a four lobe cam and two sets of contact points. One set of contact points is mounted on a stationary base and the other set is mounted on a movable base and arranged to break 45 degrees apart of distributor shaft travel which is equal to 90 degrees of flywheel travel.

Adjust both sets of contact points to a clearance within the limits of from .018″ to .024″ and preferably .022″.

Use synchronizing tool No. 1835009, Fig. 2, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor shaft in the direction of rotation until the contact points mounted on the stationary base just start to separate. The exact instant the contact points separate can best be determined by the use of a test ammeter or test lamp connected in series with the primary circuit. With the ignition switch turned on, the instant the contact points separate will be indicated by the ammeter needle dropping back to zero if an ammeter is used or by the lamp going out if a test lamp is used. With the distributor shaft held in the exact position where the stationary contact points have just separated clamp the synchronizing tool to the side of the distributor with one edge of the rotor pointing directly even with the 0° graduation on the edge of the tool.

Next, turn the distributor shaft in the direction of rotation until the same edge of the rotor is even with the 90° mark on the scale of the tool. With the distributor shaft held exactly in this position, adjust the movable set of contact points so that they just start to separate.

The above synchronizing procedure is for a distributor of clockwise rotation. If the distributor is counter-clockwise rotation, reverse the scale readings, that is, for a counter-clockwise distributor the stationary contacts would be set by the 90° mark and the movable contacts would be set by the 0° mark.

Tighten the lock screws, check the contact points for correct opening and repeat the entire synchronizing operation for accuracy.

VALVE TIMING

Valve Timing Table

The following table contains complete valve timing data for all Models of Studebaker from 1925 to 1930 inclusive. All valve tappet adjustments are given for hot motor unless otherwise designated by the letter "C." See note at the foot of the table.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
STUDEBAKER								
1925-26-27	Big Six	.006"		.006"	.006"	*1 $\frac{63}{64}$"A	Opens	
1925-26-27	Standard	.006"		.006"	.006"	*5°	Opens	
1925-26-27	Special Six	.006"		.006"	.006"	*1 $\frac{63}{64}$"A	Opens	
1928	President 8	.010"		.004"	.006"	*5°A	Opens	
1928	Dictator 6	.006"		.006"C	.008"C	*5°A	Opens	
1928	Commander 6	.006"		.006"	.006"	*T C.	Opens	
1929-30	Dictator 6	.006"		.006"C	.008"C	*5°A	Opens	
1929-30	Dictator 8	.010"		.004"	.006"	*T C	Opens	
1929	Commander 6	.006"		.006"C	.008"C	*5°A	Opens	
1929-30	Commander 8	.010"		.004"	.006"	*T C	Opens	
1929-30	President 8	.010"		.004"	.006"	*5°A	Opens	

A —After top dead center C —Valve tappets should be adjusted with cold motor T C —Top dead center
*Flywheel marked for inlet valve opening

Studebaker Big and Special Six 1925-26-27.—Set the tappet clearance for No. 1 intake at .006". The intake valve should just start to open when No. 1 piston is 1 63/64", flywheel travel, past top dead center of the exhaust stroke. The flywheel rim is stamped with timing marks for cylinders No. 1 and No. 6. (See Valve Timing Table for valve tappet clearance).

Studebaker Standard Six 1925-26-27, Dictator Six 1928-29-30, Commander Six 1929. — To check the valve timing, set the tappet clearance for No. 1 intake valve at .006". The intake valve should just start to open when No. 1 piston is 5° past top dead center of the exhaust stroke. The flywheel rim is stamped with valve timing marks for cylinders No. 1 and No. 6. (See Valve Timing Table for tappet clearance).

Studebaker Commander Six 1928.—Set the valve tappet clearance for No. 1 intake valve at .006". No. 1 intake valve should just start to open when piston No. 1 is at top dead center of the exhaust stroke. (See Valve Timing Table for valve tappet clearance).

Studebaker President Eight 1928-29-30.—Set the valve tappet clearance for No. 1 intake valve at .010". The intake valve should just start to open when No. 1 piston is 5° past top dead center of the exhaust stroke. The flywheel rim is stamped with valve timing marks for cylinders No. 1 and No. 6. After the timing operation is complete, reset the valve tappets to the correct running clearance. (See Valve Timing Table for valve tappet clearance).

Studebaker Dictator Eight 1929-30, Commander Eight 1929-30.—Set the valve tappet clearance for No. 1 intake valve at .010"; the intake valve should just start to open when No. 1 piston is at top dead center of the exhaust stroke. After the timing operation is complete, reset the valve tappets to the correct running clearance. (See Valve Timing Table for valve tappet clearance).

TIMING CHAIN ADJUSTMENT

Studebaker Standard and Special Six 1925-26-27.—These cars are equipped with a chain drive front end and manual chain adjustment. Before attempting to check the timing chain adjustment make sure that the water pump shaft is free to turn and that the packing nuts are not tight enough to cause the shaft to bind. In order to take up the slack in the chain, turn the motor over by hand ½ revolution, exercising care to see that the engine does not rock back from compression. Check the chain backlash by rotating the fan drive pulley backward and forward. There should be approximately ⅛" movement measured on the fan pulley rim. To take up the slack in the chain, loosen the three bolts in the accessory drive brackets; swing the brackets away from the motor by means of the adjusting screw until the desired adjustment is obtained. Tighten the three bolts in the accessory shaft brackets.

GAS LINE SCREENS

Studebaker all models equipped with vacuum tank fuel feed have two gas line strainer screens from the fuel supply tank to the carburetor. One strainer screen is located in the top of the vacuum tank, Fig. 3, and the other is located at the carburetor. To clean the strainer screen in the top of the vacuum tank, disconnect the feed line from the main supply tank and remove the elbow and bushing together with the strainer screen. Wash the screen in clean gasoline and blow clear with air.

Studebaker all models equipped with fuel pump fuel feed have two gasoline strainers in the gas line from the fuel tank to the carburetor. One screen is located in the top of the fuel pump bowl and the other screen is located at the carburetor. To clean the fuel pump screen, remove the glass bowl and clean the screen assembly. Make certain that the cork gasket is in good condition and properly seated when reassembling the bowl into posi-

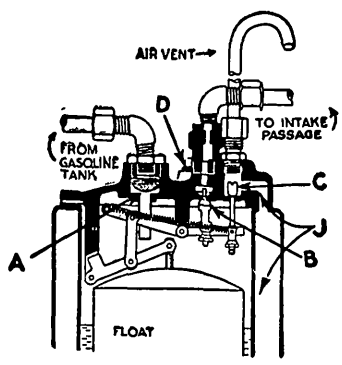


Fig 3

Upper half of vacuum tank showing position of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

tion. If the gasket is damaged, replace with a new one.

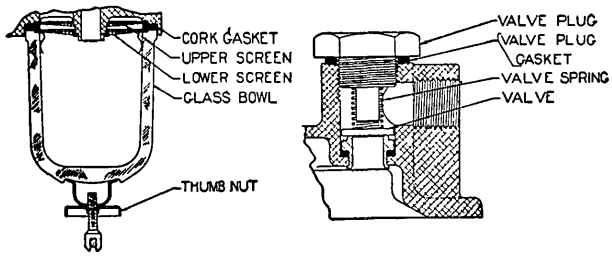


Fig 4

Cross sectional view of fuel pump glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug If the valve plug is removed see that the valve plug gasket is in good condition when the plug is replaced.

When cleaning the gas line screen at the carburetor, wash the strainer body before replacing the screen. A cross section view of the pump strainer screen and pump valve are shown in Fig. 4.

Carburetor Specifications

FLOAT LEVEL

Ball and Ball Carburetors

Two models of Ball and Ball carburetors have been used on Studebaker since 1925. Model SV-33 has the conventional flat top type float chamber as shown in Fig. 5. The fuel level may be observed by removing the step-up metering screw (I). With the engine running, the level in the well should stand between the center and the top of the horizontal passage (N). When the motor is not running, the level may be slightly higher.

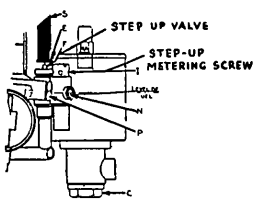


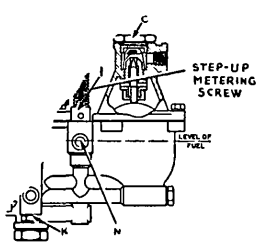
Fig 5

Sectional view of Ball and Ball SV-33 carburetor showing the conventional type of float chamber and fuel level. The height of the fuel in the bowl can be observed by removing the screw (I).

On Model SV-43 the float chamber contains only two moving parts: A short needle valve and a light spherical float acting directly upon this valve and maintaining a constant gasoline level in the bowl. Neither are adjustable, consequently the only possible trouble is damaged or worn parts or a leaky float. The level of the gasoline may be observed by removing the step-up metering screw (I), Fig. 6. With the engine running, the level in the well should stand within 1/16" of the top of the horizontal passage (N).

Fig 6

Cross sectional view of Ball and Ball SV-43 carburetor showing a cutaway section of the ball float and direct acting float valve. As shown in the cut the fuel should stand at a level approximately 1/16" from the top of the step-up metering screw passage (N). The fuel level can be observed by removing the screw (I).



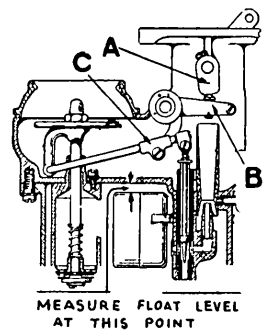
Schebler Carburetors

When making repairs to a Schebler carburetor, it is very important when reassembling to be sure that the fuel is standing at the correct level. If it should be necessary to readjust the float level, hold the carburetor rigid and bend the float lever up or down until the correct measurement is obtained.

Schebler Model S-1½", Die Cast.—The fuel will stand at the correct level in the float bowl when the distance between the top of the float and the carburetor body, measured at the point as shown in Fig. 7, is from ⅛" to 5/32".

Fig. 7

Showing points at which float level should be measured on Schebler Model S carburetors. The quickest method for checking the float level of Schebler carburetors is to see that the float lever arm stands approximately parallel with the milled flange of the carburetor body.



Schebler Model S-1½", Brass Bowl.—The fuel will stand at the correct level in the float bowl when the distance from the top of the float to the carburetor body at a point as shown in Fig. 7 is ⅛" to 5/32".

Schebler Model TX-1¼".—To check the float level, remove the upper half of the carburetor body and hold it upside down so that the float lever rests against the float valve. Measure the distance from the surface of the body to the top of the float. This measurement should be 1¼". To readjust the float level, bend the float lever up or down until the desired level is obtained. Make sure that the float assembly works freely after the carburetor has been reassembled. This can be done by removing the drain plug at the bottom of the carburetor bowl and working the float up or down by the aid of a piece of wire or any small instrument through the drain hole.

Stromberg Carburetors

Effect of Fuel on Float Level.—When Stromberg carburetors are shipped from the Chicago factory, they are set for fuel (Petrol) of specific gravity .7608 to .7368 or 54° to 60° Baumé. When higher test (lower specific gravity) 68° to 70° Baumé fuel is used, the float level rises and by bending the float arm, the gasoline level can be brought back to normal.

The above information applies especially to Stromberg Model U and UU series of carburetors. A table containing float level measurements for

high and low test fuels will be found on page 70 under the heading Effect of Fuel on Float Level.

Stromberg LS-2 and LS-3.—The fuel will stand at the correct level in the float bowl when the distance from the top surface of the float chamber casting to the surface of the fuel measures 1". If the carburetor has a sight level hole in the side of the bowl, the fuel should stand just level with the bottom of the sight level hole when the engine is not running. To readjust the float level, remove the needle valve cap from the top of the float chamber cover and the float needle stem will be seen. Loosen the lock nut and with a wrench on the flat side of the needle sleeve screw the needle down clockwise until it just seats, then back it up two turns off its seat. Turning the needle clockwise will lower the level and turning it up or counter-clockwise will raise the level.

Stromberg Model OE-1.—A small plug is located in the side of the float chamber to permit of inspection of the fuel level in the bowl. The gasoline level in the bowl should stand even with the lower edge of this hole.

To adjust the float level, remove the nut in the center of the float cover, loosen the lock nut and screw the needle valve up or down as the case may be.

Stromberg Model T-1 and TX-2.—The float level will be correct when the fuel in the float bowl stands just level with the lower edge of the inspection plug hole in the side of the float bowl.

To adjust the float level, bend the float lever arm up or down in the corner between where it touches the float needle and where it meets the float body.

From the top of the float to the bottom surface of the float chamber cover should measure 7/32" when the needle valve is seated.

Stromberg Model U-2 and UX-2.—The fuel will stand at the correct level in the float bowl when the distance from the top of the float bowl to the surface of the fuel is 9/16" (see page 70 for table of fuel levels for high and low test fuels).

To adjust the fuel level, bend the float lever arm in the corner between where it touches the float needle and where it meets the float body.

From the top of the float at the center to the lower gasket surface of the cover should measure 3/64" with the needle seated.

If it should become necessary to change the float level, it should be borne in mind that this is a direct acting float and is very sensitive to fuel specific gravity. Raising the float 1/16" raises the fuel level 1/16" and lowering the float 1/16" lowers the fuel level 1/16".

Stromberg Model UU-2.—The gasoline should stand at a level just even with the bottom of the sight level hole in the side of the float bowl with the engine not running. To adjust the float level, bend the float lever arm down to lower the level and up to raise the level.

When making a float level adjustment, it should be borne in mind that this is a direct acting float and is very sensitive to fuel specific gravity. Bending the float down 1/16" lowers the fuel level 1/16"; bending the float up 1/16" raises the fuel level 1/16". A table containing float level measurements for high and low test fuels will be found on page 70.

CARBURETOR SPECIFICATION DIAGNOSIS

Specification information for each model of carburetor used on Studebaker is given in the following paragraphs under the heading of the carburetor. All jet and nozzle measurements for all makes of carburetors used on Studebaker cars are given either in wire drill size, metric drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch and metric drill sizes will be found on page 71.

BALL AND BALL CARBURETORS

Two series of Ball and Ball carburetors were used on Studebaker automobiles from 1925 to 1927 inclusive. The series SV-33 is equipped with an automatic economizer or step-up by means of which the mixture of fuel and air gives maximum economy when the car is running at constant speed and maximum power when accelerating, climbing hills or pulling through heavy roads or sand; an idling arrangement easy to adjust which permits of slow idling speed and a choke mechanism which gives the proper mixture through the whole range of performance during the warming up period in cold weather. For a more complete description, see information under Ball and Ball Model SV-33 in the Carburetor Adjustment section for Studebaker.

The Model SV-43 is a two stage carburetor equipped with an automatic economizer or step-up by means of which the mixture of fuel and air gives maximum economy when the car is running at constant speed and maximum power when accelerating, climbing hills or pulling through heavy roads or sand.

The idling arrangement takes care of the carburetor at low speeds giving a very slow and smooth running condition. The choke mechanism gives an ideal mixture throughout the whole range of performance during the warming up period in cold weather. The float mechanism of the SV-43 is different from the SV-33 in design in that the float mechanism used on the SV-33 is of the conventional type having a cylindrical float which operates against counterweight levers that control the action of the float valve needle up and down while the float mechanism of the SV-33 type carburetor consists of a ball as shown in Fig. 6 which operates directly against the needle valve. The SV-33 carburetor is also equipped with a booster pump which gives smooth and rapid acceleration at the lowest speed with wide open throttle.

Principle of Operation

(Ball and Ball Two Stage Carburetors)

All Ball and Ball carburetors used on Studebaker automobiles are known as two stage type carburetors. As shown in Fig. 8, two complete carburetors are combined to work as one unit. Through a given range of throttle opening, all the gas is drawn through the first stage throttle at the top. The capacity of the first stage is sufficient to take care of all level road speeds up to approximately 40 or 45 miles per hour.

The second stage is brought into action by opening the main throttle to its extreme position. When the main throttle has reached a position of approximately ¾ open the cam arm integral with the main throttle shaft comes into contact with the roller on the arm of the second stage throttle shaft, causing the second stage throttle to open. The resultant action is to draw an additional or secondary supply of gasoline mixture through the second stage nozzle.

Briefly speaking, the first stage carburetor furnishes fuel for what might be termed the touring range, giving ample power for all ordinary purposes up to 40 or 45 miles per hour. The second stage carburetor supplies additional fuel for all requirements above the first stage in the form of added acceleration, power and speed.

Specification Diagnosis

(Ball and Ball SV-33 and SV-43)

How to Determine Jet Size (Ball and Ball Carburetors).—For all models of Ball and Ball carburetors used on Studebaker cars, the factory has provided jets of various sizes to accommodate all conditions of adjustment and under no consideration should jets be plugged up or drilled out. In service, carburetors will be encountered where mechanics unfamiliar with the correct adjustment procedure have plugged up or drilled out first stage and metering jets. When a car comes in that will not perform properly, and the trouble has been traced to the carburetor, it is well to check these jets first.

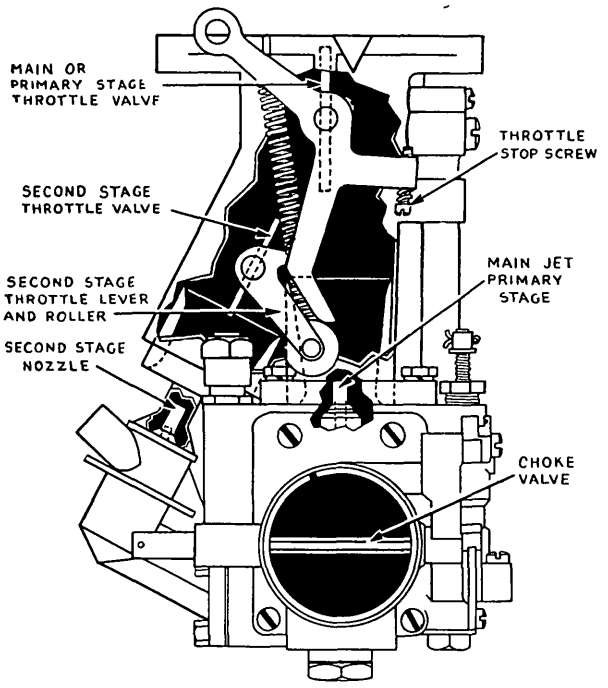

MAIN OR PRIMARY STAGE THROTTLE VALVE
THROTTLE STOP SCREW
SECOND STAGE THROTTLE VALVE
MAIN JET PRIMARY STAGE
SECOND STAGE THROTTLE LEVER AND ROLLER
SECOND STAGE NOZZLE
CHOKE VALVE

Fig 8

Cutaway section of Ball and Ball two stage carburetor, showing the arrangement of the jet and throttle valve assemblies for both the first and second stage units The second stage unit does not come into operation until the main throttle is approximately three-fourths open.

To enable the mechanic to determine whether a jet is of the correct size, a table containing the jet number and corresponding wire drill size for all jets is given below. Each jet used in a Ball and Ball carburetor has the number of the jet stamped on the head of the screw. This number refers to the diameter on the metering orifice in hundredths of a millimeter. Larger numbers meaning richer mixtures and smaller numbers meaning leaner mixtures.

To use the table of drill specifications, first find the jet size by either referring to the table of jet specifications below or by inspecting the heads of the jet screws in the carburetor. The nearest wire drill size corresponding to the metric dimensions of the jets for any particular jet size will be found in the table of drill specifications below.

Primary jets are supplied in steps of .05 MM and one intermediate size, i.e. 90, 92, 95, etc.

Second stage, step-up and idling fuel jets are supplied in steps of .05 MM only; that is, 90, 95, 100, etc.

Jet Specification Table

(Ball and Ball SV-33 and SV-43)

The following table contains the standard specifications for Ball and Ball carburetors used on Studebaker automobiles. The metric drill size for any particular jet can be determined by the table of drill sizes below.

Carb. Model	Primary Jet Size	2nd Stage Jet Size	Step-Up Jet Size	Idling Fuel Jet	2nd Stage Throat
SV-33	*105	120	115	75	24
SV-43	110	145	115	60	34

*In cold climates, use primary metering screw .05 MM larger for winter

Drill Specifications

(Ball and Ball All Models)

The following table contains the corresponding wire drill size for the metric drill dimensions of all jets used on Ball and Ball carburetors by jet and wire drill numbers. Each jet used in a Ball and Ball carburetor has the number of the jet stamped on the head of the screw.

Jet Size	Corresponding Wire Drill Size	Jet Size	Corresponding Wire Drill Size
65	71	102	60
70	70	105	59
75	69	107	58
80	68	110	57
83	67	120	56
85	66	130	55
90	65	140	54
92	64	150	53
95	63	160	52
97	62	170	51
100	61		

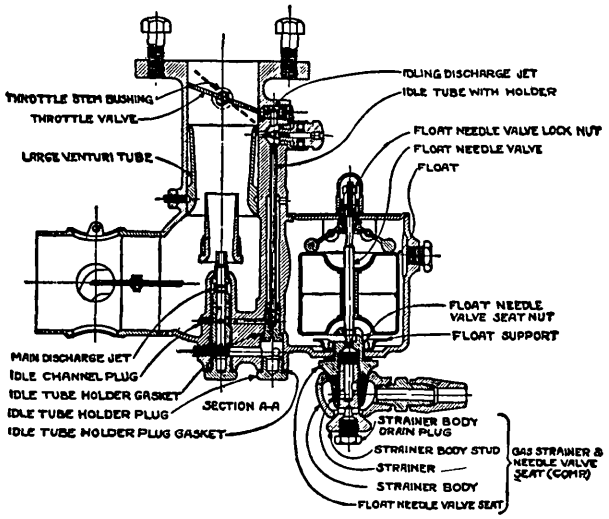


Fig. 8A

Cross section view of Stromberg Model O carburetor showing the main discharge jet, the idling system and the float assembly. The Model O and Model T Stromberg carburetors are practically the same with the exception that the Stromberg T carries the same float assembly as is used in the Model U and the economizer needle on the Model O is drilled with an air bleed hole while on the Model T the economizer needle is blank and the air bleed is located in the side of the carburetor body.

SCHEBLER CARBURETORS

Two types of Schebler carburetors have been used on Studebaker automobiles.

The Model S-1½" is a true metering device. The acceleration of the motor is taken care of by a small pump built into the carburetor. This only operates on a sudden opening of the throttle and by making changes in the size of the cross passages we are able to get a smooth acceleration.

Three adjustments are provided; namely: the idle, range and power adjustments. Complete information covering the specification diagnosis and adjustment information will be found in the Schebler section under the heading Schebler Model S in the back of this book.

The Model TX-1¼" Schebler carburetor is of the plain tube type in which a single fixed venturi is used. Normally all the air except that which passes through the idle air bleed and idle system passes through this fixed venturi. All the metered fuel except the idle fuel and warming up and starting fuel passes through a nozzle whose tip extends into the throat of the venturi and the fuel mixes at the throat of the venturi with the air passing through. There are no moving parts controlling the normal metering of the fuel except a throttle operated metering pin which only changes a fuel feed opening from one size to a larger size when the throttle is opened wide. A complete description of the principle of operation and cross section views of Schebler TX carburetors will be found in the Schebler section in the back of this book.

Specification Table.—Schebler carburetor specifications include only those parts that are most likely to be at fault if a carburetor adjustment cannot be obtained. The following table contains carburetor specifications for Schebler carburetor.

Studebaker, President, 1928

(Schebler S 1½" Engine 3⅜"x4½")

Description of Part	Part No. or size
Air Valve Spring	*16–48–U
Needle Valve complete	†#10
Accel. Pump Cross Passage	‡#52
Accel. Pump Cylinder	S–1300–D

*The dimensions of the air valve springs are as follows: No of coils: 10½, length 2⅝" to 3⅛", wire gauge: 15.

†The needle assembly number is indicated by the number of rings machined on the needle body.

‡Accelerating pump metering cross passage sizes correspond to wire drill sizes. A #52 passage is the same size as a #52 wire drill. The size of the passage is stamped on the side of the body of the passage.

STROMBERG CARBURETORS

Several models of Stromberg carburetors have been used on Studebaker automobiles from 1925 to 1930 inclusive. The jet specification information for each model of carburetor is arranged in tables under the model of car. These tables contain the calibration specifications for each model of carburetor used on Studebaker and will be found in the specification diagnosis section below.

Jet Measurements.—All jet and nozzle measurements for all models of Stromberg carburetors used on Studebaker are given either in wire drill size or thousandths of an inch. Venturi tube measurements are given in fractions of an inch. A table containing wire drill sizes from No. 1 to No. 80 in terms of thousandths of an inch will be found on page 71.

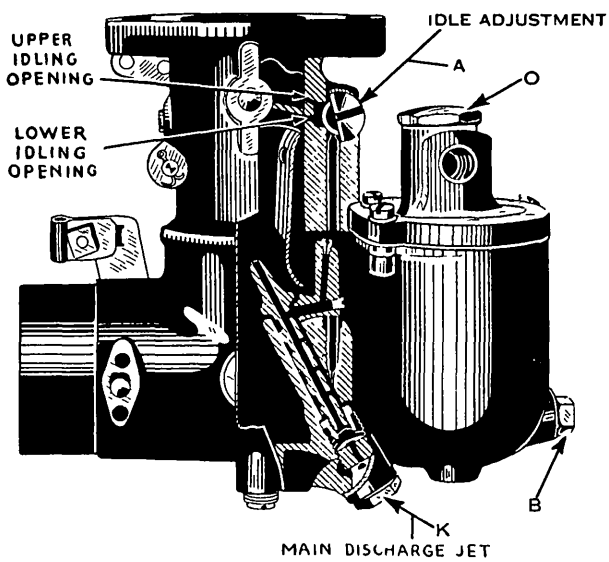


Fig. 8B

Cutaway sectional view of Stromberg Model U carburetor showing position of the diagonal main discharge jet; also the upper and lower idling openings which supply gasoline to the carburetor throat at idling and low speeds.

How to Read Stromberg Model Numbers.—The first letter of a Stromberg model designation indicates the type; the following letter indicates some form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor. The size starting from 1" which is No. 1 and increasing in ¼" steps. For example, take a U type carburetor. A U-1 has a 1" throat while a U-2 has a 1¼" throat. The actual diameter of the carburetor opening is 3/16" greater than the nominal rated size in accordance with the standard of the Society of Automotive Engineers.

An "X" in the model symbol indicates that the flange bolt holes are at right angles to the line of air entrance to the float chamber. The carburetor being usually installed so that the throttle shaft is parallel to the engine and crankshaft and the line of the intake manifold. The letter "V" in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as "TV" or "TXV".

Specification Diagnosis

(Stromberg Carburetors)

Several models of Stromberg carburetors have been used on Studebaker automobiles from 1925 to 1930 inclusive. In service, these carburetors are sometimes changed by mechanics who do not understand carburetor calibration procedure. When these cases are encountered, complete carburetor diagnosis information will be found in the Stromberg section under the heading of the particular carburetor model in question in the back of this book.

The specification diagnosis section contains complete information on the cause and the symptoms of trouble as the result of someone changing jets and passageways by either soldering them up or drilling them out and should be consulted in every case where trouble is encountered as the result of someone tampering with the carburetor.

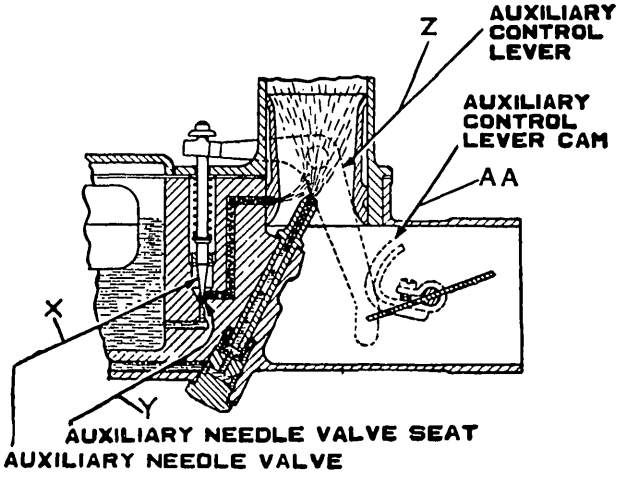


Fig. 8C

Section of Stromberg Model U carburetor showing auxiliary control lever (C) and auxiliary control lever cam (AA). When the choke valve is open there should be sufficient clearance between the auxiliary control lever cam and the auxiliary control lever to permit the auxiliary needle to rest firmly on its seat

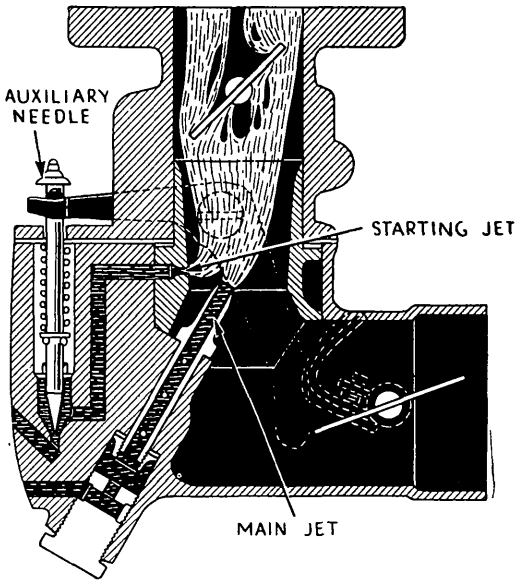


Fig. 8D

Cross sectional view of Stromberg Model U carburetor showing auxiliary control needle off its seat, thus permitting gasoline to be drawn into the carburetor venturi through the starting jet.

Specification Tables.—The following tables contain carburetor calibration specification information for all models of Stromberg used as equipment on Studebaker automobiles. These tables are arranged by car model and should be referred to in every case where trouble is encountered as the result of someone tampering with the carburetor jets.

Studebaker, Standard 6, 1924-25-26

(Stromberg OE-1 Engine 3⅜"x4½")

Description of Part	Size thousandths inch	Wire drill size
Idle Disharge Jets	.....	#52
Main Metering Jet	Adjustable	
Economizer Needle Valve (needle lift ⅜")	.....	#56
Main Discharge Jet	.....	‡#A–36, #B–20
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	#34
Accelerating Well Discharge Jet	.....	#56
Venturi	15/16"	.....

‡First bore of main discharge jet is #36 wire drill; second bore #20 wire drill.

Studebaker, Standard 6, 1925-26-27

(Stromberg T-1 Engine 3⅜"x 4½")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#70
Main Metering Jet	Adjustable	
Economizer Needle Valve (needle lift ⅜")	.....	Blank
Main Discharge Jet	.....	†#A–36, #B–20
High Speed Air Bleeder	.....	#56
Accelerating Well Bleeder	.....	‡#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	31/32"	.....

*The idle jet above the throttle is a #70 wire drill size; the jet below the throttle is a #55 wire drill size.

†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.

‡First bore of main discharge jet is #36 wire drill; second bore #20 wire drill.

Studebaker, Big Six, 1926

(Stromberg LS-2 Engine 3⅞"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#52–#70
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ⅜")	.....	#56
Main Discharge Jet	.....	‡#A–30, #B–15
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	#34
Accelerating Well Discharge Jet	.....	#54
Venturi	1⅛"	.....

*The idle jet above the throttle is a #70 wire drill size; the jet below the throttle is a #52 wire drill size.

‡First bore of main discharge jet is #54 wire drill; second bore #34 wire drill.

Studebaker, Commander Six, 1927-28-29

(Stromberg TX-2 Engine 3⅞"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#68
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ⅜")	.....	Blank
Main Discharge Jet	.....	‡#A–34, #B–18
High Speed Air Bleeder	.....	#65
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	1⅛"	.....

*The idle jet above the throttle is a #68 wire drill size; the jet below the throttle is a #55 wire drill size.

†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.

‡First bore of main discharge jet is #34 wire drill; second bore #18 wire drill.

Studebaker, Big Six, 1927

(Stromberg OX-2 Engine 3⅞"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#52–#66
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ⅜")	.....	#56
Main Discharge Jet	.....	‡#A–34, #B–18
High Speed Air Bleeder	.....	.....
Accelerating Well Bleeder	.....	†#30–#34
Accelerating Well Discharge Jet	.....	#54
Venturi	1⅛"	.....

*The idle jet above the throttle is a #66 wire drill size; the jet below the throttle is a #52 wire drill size.

†This is a double end bleeder having one end #30 wire drill size and other end #34 wire drill size.

‡First bore of main discharge jet is #34 wire drill; second bore #18 wire drill.

Studebaker, Dictator Six, 1927-28

(Stromberg TX-2 Engine 3⅜"x 4½")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#68
Main Metering Jet		Adjustable
Economizer Needle Valve (needle lift ⅜")	.....	Blank
Main Discharge Jet	.....	‡#A–34, #B–18
High Speed Air Bleeder	.....	#70
Accelerating Well Bleeder	.....	†#26–#30
Accelerating Well Discharge Jet	.....	#54
Venturi	1 1/16"	.....

*The idle jet above the throttle is a #68 wire drill size; the jet below the throttle is a #56 wire drill size.

†This is a double end bleeder having one end #26 wire drill size and other end #30 wire drill size.

‡First bore of main discharge jet is #34 wire drill; second bore #18 wire drill.

Studebaker, Commander Six, 1927-28-29

(Stromberg UX-2 Engine 3⅞"x 5")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#66
Main Metering Jet	.070"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-Pass Jet	.042"	.....
Main Discharge Jet	.....	†#A–30, #B–28
High Speed Air Bleeder	.....	#56
Syringe Valve	.....	#57
Venturi Tube (size in inches)	1 5/32"	.....

*The idle jet below the throttle is #66 wire drill size; the jet below the throttle is #56 wire drill size.

†First bore of main jet is a #28 wire drill; second bore is a #30 wire drill.

Studebaker, Dictator Six, 1928

(Stromberg UX-2 Engine 3⅜"x 4½")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#53–#64
Main Metering Jet	.064"	.....
By-Pass Jet	.036"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder (in body)	.....	#58
Pump Reducer	.....	#68
Venturi Tube (size in inches)	1 1/32"	.....

*The idle jet below the throttle is a #53 wire drill size; the jet above the throttle is #64 wire drill size.

Studebaker, President 8, 1928-29-30

(Stromberg UU-2 Engine 3½"x 4⅜")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#56
Main Metering Jet	.035"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-pass Jet	.....	.....
Main Discharge Jet	.....	#30
High Speed Air Bleeder	.....	#70
Pump Reducer	.....	#65
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1⅛"	.....

*The idle jets below the throttle are #55 wire drill size; the jet above the throttle is #56 wire drill size.

Studebaker, Dictator 6, 1929

(Stromberg UX-2 Engine 3⅜"x 4⅜")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#66
Main Metering Jet	.063"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-pass Jet	.038"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#60
Pump Reducer	.....	#58
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/32"	.....

*The idle jet below the throttle is #55 wire drill size; the jet above the throttle is #66 wire drill size.

Studebaker, Commander 6, 1929

(Stromberg UX-2 Engine 3⅜"x4⅝")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#55–#64
Main Metering Jet	.065"	.....
High Speed Needle Valve (open No. notches)	.....	.....
By-pass Jet	.036"	.....
Main Discharge Jet	.....	#32
High Speed Air Bleeder	.....	#58
Pump Reducer	.....	#68
Accelerating Nozzle	.....	.....
Venturi Tube (size in inches)	1 1/16"	.....

*The idle jet below the throttle is #55 wire drill size; the jet above the throttle is #64 wire drill size.

Studebaker, Commander 8, 1928-29

(Stromberg UX-2 Engine 3"x4¼")

Description of Part	Size thousandths inch	Wire drill size
Idle Discharge Jets	.....	*#56–#66
Main Metering Jet	.064"	.....
By-Pass Jet	.034"	.....
Main Discharge Jet	.....	#30
High Speed Air Bleeder	.....	#65
Pump Reducer	.....	#68
Venturi Tube (size in inches)	1 3/32"	.....

*The idle jet below the throttle is #56 wire drill size; the jet above the throttle is #66 wire drill size.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
STUDEBAKER					BALL & BALL
1925	Big 6	Own	6	3⅛"x5 "	SV 33 1½"
1926	Big 6	Own	6	3⅛"x5 "	SV 33 1½"
1927	Big 6	Own	6	3⅛"x5 "	SV 43 1½"
					SCHEBLER
1928	Pres.	Own	8	3⅜"x4⅜"	S 1½"
1930	Dict. 6	Own	6	3⅜"x4⅛"	TX 1¼"
					STROMBERG
1925	Standard	Own	6	3⅜"x4½"	T-1, OE-1
1926	Big 6	Own	6	3⅛"x5 "	LS-2
1926	Standard	Own	6	3⅜"x4½"	T-1
1927	Standard	Own	6	3⅜"x4½"	T-1
1927-28-29	Commander	Own	6	3⅛"x5 "	TX-2
1927	Big 6	Own	6	3⅛"x5 "	OX-2
1929	Dict. 6	Own	6	3⅜"x4⅛"	UX-2
1927-28	Dict. 6	Own	6	3⅜"x4½"	TX-2
1928	Dict. 6	Own	6	3⅜"x4½"	UX-2
1927-28-29	Comm. 6	Own	6	3⅛"x5 "	UX-2
1929	Comm. 6	Own	6	3⅜"x4⅜"	UX-2
1928-29	Comm. 8	Own	8	3 "x4¼"	UX-2
1928-29-30	Pres. 8	Own	8	3½"x4⅜"	UU-2
1930	Dict. 8	Own	8	3 1/16"x3¾"	U-2
1930	Comm. 8	Own	8	3 1/16"x4¼"	UX-2
1930	Pres. 8	Own	8	3½"x4⅜"	UU-2

ADJUSTMENT PRECAUTIONS

A correct carburetor adjustment cannot be obtained on any model of Studebaker unless the motor is thoroughly warmed up. Let the engine run at idle speed for at least 10 minutes.

Before changing any of the carburetor adjustments check for leaky carburetor flange and manifold gasket and make sure that the choke valve opens and closes properly.

Effect of Intake Manifold on Carburetor Adjustment.—It is very important when making a carburetor adjustment that from 10 to 15 seconds time is allowed after each movement of the adjusting screw for fuel that has accumulated in the manifold to pass into the motor. Especially is this true when making an adjustment from a rich to a lean mixture. The tendency is for the fuel to pile up on the walls and in the corners of the manifold so that unless sufficient time is allowed for this fuel accumulation to pass into the motor, an accurate adjustment cannot be obtained. Insufficient time allowance during the adjustment procedure is generally indicated by the motor performance gradually improving and then the motor suddenly dying during the adjustment operation.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smoothly. This is especially true of the idle and range adjustments and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment there is a wide range between the points where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

High Vacuum in Manifold (Stromberg Model U).—Trouble may be experienced in obtaining a correct idle adjustment or with a tendency for the motor to die on deceleration. The car may idle properly on the service floor but when the motor is accelerated to full open throttle and then decelerated suddenly to full closed throttle, a tendency to Roll and load may be noticed. The car owner generally complains that the motor dies in traffic.

This trouble is generally caused by excessive vacuum above the throttle valve and can be corrected by drilling a No. 52 hole through the throttle valve butterfly about 5/16" in toward the center of the carburetor throat on the same side of the throttle shaft and opposite the idling jets.

Caution: The throttle valve should never be drilled unless trouble cannot be corrected by reducing the size of the main metering jet or economizer by-pass jet.

Auxiliary Needle Valve Held Open.—On cars equipped with Stromberg Model U carburetors, low gasoline mileage may be caused by the auxiliary control lever cam riding the auxiliary control lever, thus holding the auxiliary needle valve open.

To correct this trouble, set the auxiliary control lever cam so that there is approximately 1/16" clearance between the cam and the auxiliary control lever.

Also check to see that the auxiliary control lever fulcrum screw does not bind and that the lever works free.

BALL AND BALL MODEL SV-33

This carburetor is of the plain tube two stage type. The first ¾ of throttle opening operates the valve of the primary stage, and the balance of the throttle opening operates the secondary stage valve allowing gas from both throats to pass into the intake manifold. (See Principle of Operation page 318).

All orifices are fixed. The mixture in the operating range is determined by the diameter of the passage in the primary metering screw (B) Fig. 9. Fuel passing through the second stage nozzle is metered through the metering screw (H) and operates only when the second stage throttle blade is opened. As soon as the main throttle blade is opened wide enough to give a speed of approximately 10 to 12 miles per hour, the idling adjustment ceases to have any affect. Calibrated metering screws control the quality of the mixture both in the primary and in the secondary stages respectively, each metering screw being stamped with a number on its head indicating the size of the orifice. Larger numbers meaning richer mixtures.

Automatic Economizer.—The automatic economizer or step-up (F), Fig. 10, is a device which automatically causes the carburetor to deliver a lean mixture, giving maximum economy when running steadily at constant speed and a rich mixture giving maximum power when accelerating or pulling hard on a hill or in sand. The manifold vacuum above the throttle acts upon the plunger (E) holding it up against the seat when the manifold vacuum is high, as when the engine operates at constant speed. The plunger is held up as shown and the valve (F) is closed, causing the primary nozzle to receive fuel only through the primary metering screw (B), Fig. 9.

If the manifold vacuum is low as when the motor is accelerating or pulling hard the plunger (E), Fig. 10, is released and being forced down by the spring (S) opens the step-up valve (F); fuel then flows to the primary nozzle through the step-up passage as well as through the primary metering screw (S), Fig. 9, and enrichens the mixture to give maximum power. The quantity of step-up is entirely controlled by the size of the step-up metering orifice or screw (I), Fig. 10.

Carburetor Adjustment.—The idle mixture and closed throttle running are controlled by the idling screw (L), Fig. 9. Screwing this screw in reduces the air, giving a richer mixture. The arrow on the head of the screw usually points upward when the screw is turned all the way in. With the motor in good condition, the proper adjustment should be obtained within ¼ to ¾ of a turn open from the closed position. The best and most stable idle will be obtained with a mixture as rich as possible without Rolling with the spark retarded. If there is a weak cylinder or if the spark is too far advanced the engine will Roll as with too rich an adjustment. If after smooth running has been obtained by means of the adjusting screw the motor idles too fast, turn the stop screw (T) on the throttle lever to obtain the desired engine idling speed.

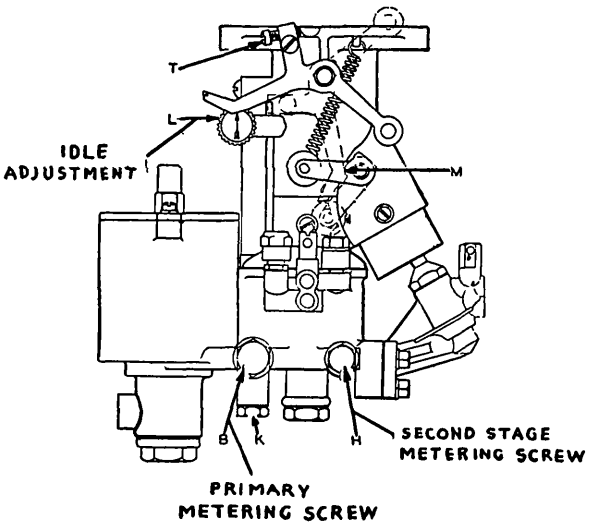


Fig. 9

View of Ball and Ball Model SV-33 carburetor used on Studebaker automobiles. This is a plain tube, two stage carburetor. The fuel to the primary stage is controlled by the primary metering screw as shown at (B) and the fuel to the second stage throat is controlled by the second stage metering screw (H). The second stage of the carburetor does not come into operation until the main throttle is three-fourths open.

BALL AND BALL MODEL SV-43

This carburetor is of the plain tube two stage type; the first ¾ of throttle opening operates the valve of the primary stage and the balance of the throttle opening operates the secondary stage, allowing gas from both throats to pass into the intake manifold. The important features of this carburetor are the automatic economizer or step-up by means of which the mixture of fuel and air gives maximum economy when the car is running at constant speed and maximum power when accelerating, climbing hills or pulling through heavy roads or sand; an idling adjustment which operates on air; a booster pump which gives smooth and rapid acceleration from lowest speed to wide open throttle.

Metering Screws.—As soon as the main throttle blade is opened wide enough to give a speed of from 10 to 12 miles per hour the idling adjustment influence becomes nil. Calibrated metering screws control the quality of the mixtures both for the primary and for idling respectively. Each metering screw carries a number on its head indicating the size of the orifice. Larger numbers meaning richer mixtures.

The fuel to the primary stage is metered by the screw (B), Fig. 11, and fuel for idling is metered by (K). Fuel is metered through the second stage only when the second stage throttle blade is opened

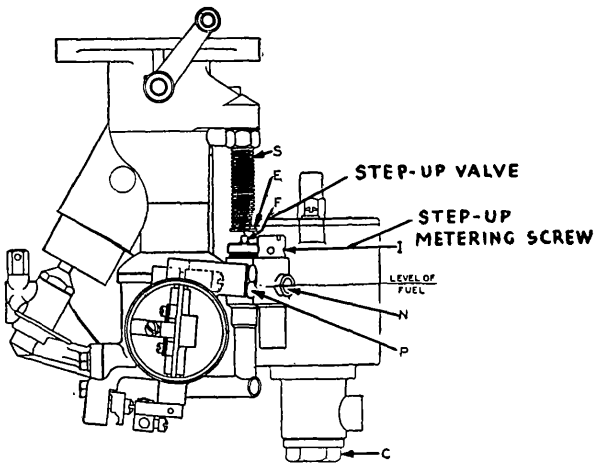


Fig. 10

View of Ball and Ball Model SV-33 carburetor used on Studebaker automobiles showing the vacuum controlled step-up valve (F). Gasoline is metered to the step-up passage by the step-up metering screw (I).

and measured through the second stage nozzle and not through plug screw (H) as on other models. Primary and second stage metering screws and nozzles of sizes other than standard may be obtained from the Penberthy Injector Company.

Changing the size of screw (B), Fig. 11, does not affect the mixture of the second stage and likewise the size of the second stage nozzle has no influence on the primary stage.

Automatic Economizer.—The automatic economizer or step-up valve (F), Fig. 11, is a device which automatically causes the carburetor to deliver a lean mixture, giving maximum economy when running steadily at constant speed and a rich mixture, giving maximum power when accelerating or pulling hard on a hill or in sand.

The manifold vacuum above the throttle acts upon the plunger (E), holding it up against its seat when the manifold vacuum is high as when the engine operates at constant speed, the plunger is held up as shown and the valve (F) is closed, causing the primary nozzle to receive fuel through the primary metering screw (B) only.

If the manifold vacuum is low as when the motor is accelerating or pulling hard the plunger (E) is released and being forced down by the spring (S) opens the step-up valve (F); then fuel flows to the primary nozzle through the step-up passage as well as through the primary metering screw (B) as long as the throttle is open for a speed greater than that of the motor, enriching the mixture to give maximum power. The quantity of step-up fuel is entirely controlled by the size of the step-up metering orifice screw (I), Fig. 12.

Warming-Up Control.—In addition to a conventional choke for starting this carburetor is fitted with a mixture control for warming up.

The valve (W), Fig. 12, closes a direct fuel passage from the float chamber to the primary nozzle tip. The position of the choke control on the instrument board governs the quantity of fuel that can flow through the warming up valve (W).

For normal running, the choke is wide open and the warming up valve (W) is closed. The primary carburetor then delivers a normal economical mixture. Until the choke is half closed, the restriction on the flow of air to the primary nozzle is negligible, but the warming up valve being open in that range, the mixture is richer.

With the choke valve fully closed, the suction on the primary nozzle and tip is greatly increased, a feature that renders starting easy in cold weather with low grade fuel.

Booster Pump.—The booster pump acts only when the second stage is open. This feeds a definite quantity of fuel over a set period of time regardless of the rate of opening of the throttle or of the engine speed. The pick-up shot per revolution is thus greatest at low speed and negligible at high speed, which is an ideal condition. As shown in Fig. 11, the booster pump is controlled by an arm and roller which is connected rigidly to the throttle blade shaft of the secondary carburetor throat so that as the throttle blade for the secondary throat is opened the booster pump plunger is automatically forced down.

Carburetor Adjustment.—The mixture for closed throttle running or idling is controlled by the idling adjusting screw (L), Fig. 11. Screwing it in reduces the air, giving a richer mixture. With the motor in good condition, the proper adjustment should be obtained between 1 and 1½ turns open from the closed position.

The best and most stable idle will be obtained with a mixture as rich as possible without Rolling

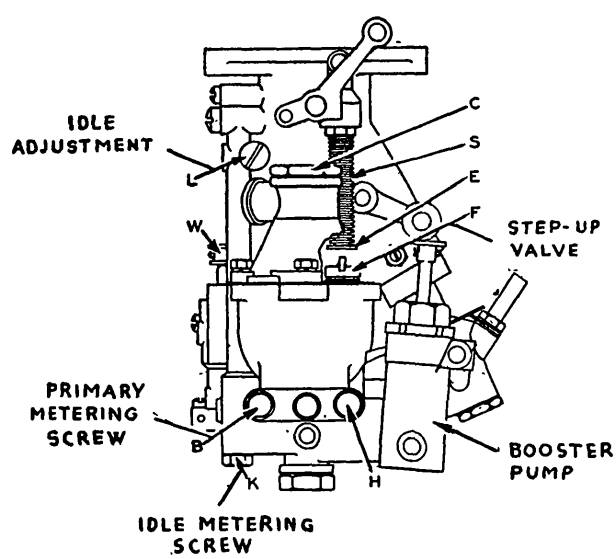


Fig. 11

View of Ball and Ball Model SV-43 carburetor showing the idle adjustment, primary metering screw, idle metering screw, booster pump and step-up valve. This carburetor differs from other models in that the fuel to the second stage is metered by the second stage nozzle.

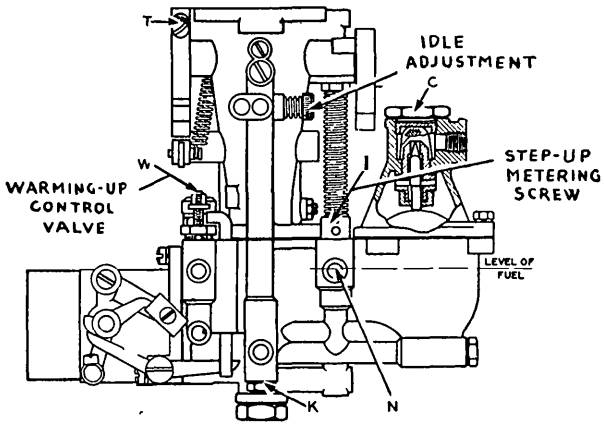


Fig. 12

View of Ball and Ball Model SV-43 carburetor used on Studebaker showing the warming up control valve and the vacuum controlled metering valve and step-up metering screw (I).

with the spark retarded. If there is a weak cylinder or if the spark is too far advanced the engine will Roll as with too rich an adjustment. If after smooth running has been obtained by means of the adjusting screw the motor idles too fast, turn the stop screw (T), Fig. 12, on the throttle lever to obtain the desired speed.

SCHEBLER MODEL S

Two types of Schebler carburetors have been used on Studebaker automobiles.

The Model S is an air valve carburetor having two air inlets. The fixed air opening is through the venturi and is very small, furnishing barely enough air to enable an engine to idle slowly. Due to the small opening through the venturi, the velocity of the air passing through it is very high even when the engine is idling. This enables the air to pick up the gasoline at the nozzle and atomize it thoroughly. The venturi suction on the gasoline at the nozzle is quite strong, making it possible to control the mixture very accurately and to get positive and reliable action at low speeds.

The auxiliary air valve is closed for idling and wide open for full power. It is very large, making it possible to handle large amounts of air at the smallest suction.

Complete adjustment and carburetor diagnosis information for Schebler Model S carburetors will be found in the Schebler section under the heading of the carburetor in the back of this book.

SCHEBLER MODEL T CARBURETORS

Schebler Model T carburetor, used on Studebaker automobiles is of the plain tube type in which the openings and gasoline jets are fixed in size—gasoline being automatically and accurately measured by the air flow.

The metering orifice is calibrated at the factory to supply the proper amount of fuel at high and intermediate speeds, so that no manual adjustment for these speeds is necessary. The only adjustments provided on this carburetor are the idling or low speed adjustment and a concealed economizer adjustment.

Idling Adjustment.—To secure the proper idling or low speed adjustment proceed as follows: After the engine is thoroughly warmed up to normal operating temperature, set the hand throttle lever on the steering wheel so that the engine is running at a medium, steady idling speed. Then gradually turn the low speed adjustment right or left until the steadiest or fastest running for that throttle position is obtained. This adjustment controls an air passage in such a manner that screwing it in gives a richer mixture and screwing it out gives a leaner mixture. When this adjustment is correct, the needle should be off the seat 1½ turns. The idle adjustment should be adjusted on the lean side for best economy.

If after the adjustment is made and the throttle lever is retarded, the engine idles too fast, turn the small throttle stop screw counter-clockwise to reduce the minimum throttle opening until the desired idling speed is reached. If the engine idles too slow, as evidenced by its Rolling and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed. When the engine is idling properly, there should be a steady hiss in the carburetor.

Economizer Adjustment.—The concealed economizer adjustment is located at the right (engine side) of the low speed or idling jet in the carburetor float chamber and is adjacent to the venturi tube. This adjustment is of the conventional needle valve type, which governs the fuel flow through a given orifice. The needle valve is equipped with a notched or serrated head and the number of notches or serrations the needle valve is away from the seat is stamped on the front of the carburetor manifold flange. For example, assume that the needle valve is backed off 12 notches from the seating position, then the flange will be stamped 12. The number of notches it is necessary to set the needle valve away from the seat to secure a standard adjustment is determined at the factory by accurate and sensitive flow meters. This number is stamped on the flange in order that the original adjustment may readily be made without the necessity of special equipment and with a minimum of time. This needle valve adjustment is concealed by the top half of the carburetor, but may be reached with a small offset screwdriver after the brass plug located directly over it has been removed. Unless the number of notches the needle valve is away from the seat has been definitely determined in advance, this method is not to be used. For most purposes it will be found advisable to remove the carburetor from the manifold and remove the carburetor upper half. This will expose to visual examination the relative location of the needle valve to the seat, and with the aid of a small screwdriver the notch at which the needle valve seats may be determined without damage to the valve.

Caution: Do not force this valve into the seat. After this has been determined, back off the number of notches stamped on the carburetor flange for the original factory adjustment. Only in the following special cases will it be advisable to alter this original setting.

Opening the economizer adjustment more than the factory setting to secure greater acceleration should not be done except when the owner demands performance during the warming up period. Even then he should be advised that this of necessity must be done at the expense of a slight increase in fuel consumption. As previously stated, this adjustment will require little or no attention in the vast majority of cases.

Carburetor Flooding.—In cases of flooding it is well to remove the drain plug and allow the carburetor bowl to drain; this will permit the float to drop to its lowest position and completely open the float needle valve. The first few pulsations of the fuel pump will force the gasoline through the float valve and force any dirt that may have collected on this seat on to the carburetor.

Complete information covering the adjustment procedure and principle of operation for Schebler Model T carburetors used on Studebaker automobiles will be found under the carburetor heading in the Schebler section in the back of this book.

STROMBERG CARBURETORS

All Stromberg carburetors used on Studebaker automobiles are of the non-air valve plain tube type. Complete carburetor adjustment and specification diagnosis information will be found in the Stromberg section under the carburetor heading in the back of this book.

Stutz 1925-30

Motor Tune-Up

The best and most efficient motor performance will be obtained with all models of Stutz if the ignition, valve timing, valve tappets, contact point clearance and spark plug point gaps are correctly set. Special care should be exercised to see that the distributor points on those models equipped with two sets of contacts are correctly synchronized.

The carburetor has but one adjustment (idle adjustment for each barrel) and very little trouble will be experienced with the carburetor other than to keep the jets clean and properly adjusted.

The special tune-up information immediately following the tune-up operations should be closely observed.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Check timing chain for slack.
   Note: Chain sag is controlled by an automatic take-up in the timing chain case. Slack in the chain can be checked by rocking the fan back and forth. Backlash indicates a faulty condition of the automatic take-up, which may be due to a broken spring. To correct this trouble, remove the radiator, timing case cover and make the necessary repairs. (See Timing Chain Adjustment).
3. Synchronize distributor points.
   Note: The above operation is necessary only on models equipped with distributors having double breaker arms.
4. Check ignition timing; adjust if necessary.
5. Adjust the valve tappets and free up valves.
6. Clean gas line strainers and screens; tighten high and low speed jets in the carburetor. Also check gas lines for loose fittings.
7. Check fan and generator belts; adjust if necessary.
   Note: The above operation applies to Model 6-95 1925 and Series L 8 cylinder 1930 only.
8. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
9. Check throttle valve for opening.
10. Check choke valve for position.
11. Check manifold gasket; see that all manifold nuts are tight.
12. Check overhead cam for lubrication with cover removed.
    Note: Oil should drip from the metering pin in each cam.
13. Check high tension wiring.
14. Adjust carburetor.
15. Road test car.
    Note: The ignition should never be advanced beyond a point of where a spark knock occurs except under heavy load conditions.

Ragged Idle

Valve Tappet Adjustment.—On Model 6-95 1925, a poor idling condition may be caused by improperly adjusted valve tappets. The valve tappet adjustment on these models should be carefully checked. (See Valve Timing Table for valve tappet clearances).

Spark Plug Gap Clearance.—Stutz motors are very sensitive to spark plug gap clearance and when set too close the motor will idle unevenly. On Model 6-95 1925, the spark plug gaps should be adjusted to exactly .018" and on all other models the gap clearance should be adjusted to .022".

Distributor Contact Point Clearanc .—A poor idling condition may be due to improperly spaced contact points. On models equipped with double breaker arms it is very important that the ignition timing is correct and that the contact points are correctly synchronized. (See Ignition Timing section).

Weak Coil or Condenser.—If after checking the motor as described in the above paragraphs a rough idling condition still exists, test the coil and condenser. A poor idling condition will be the result if the coil or condenser is weak.

Carburetor.—The carburetor is the last unit that should be checked. Do not tamper with the carburetor until after the ignition and valve timing, spark plugs and contact points have been checked. A poor idling condition may be caused by loose high and low speed jets or by dirt in the carburetor.

If the carburetor is dirty, it should be removed from the intake manifold and all jets and passageways thoroughly cleaned in clean gasoline.

Poor Acceleration

Timing.—Poor acceleration may be caused by late timing. Check both the valve and ignition timing. (See Valve and Ignition Timing sections).

Distributor Contact Points and Spark Plug Gap Clearance.—Check the breaker points and spark plug gap clearance. Poor acceleration may be caused by a too narrow gap. Contact point clearance may change in service due to a worn fiber cam brush on the breaker arm. When this trouble is encountered, replace the breaker arm and readjust the contact point clearance.

Ignition Governor.—The ignition governor should be inspected to see that the counterweights work freely and do not stick in the retarded position. Any tendency to sticking will cause sluggish motor action. The governor should be lubricated frequently by putting a few drops of light oil on the felt pad on the upper end of the distributor shaft directly under the distributor rotor.

If the governor should become inactive, remove and dismantle the distributor assembly, free up all working parts and replace any defective parts.

Low Gasoline Mileage

Low gasoline mileage may be due to incorrect timing, tight brakes, slipping clutch and any other cause that would add an undue resistance to the car.

Loose Low Speed Jet.—A common complaint of low gasoline mileage may be caused by the low speed jet working loose and following down the threads. This trouble can generally be detected by a leak at the carburetor. To correct the trouble, screw the jets up tightly into place

High Float Level.—Another cause for low gasoline mileage may be a high float level which also will cause sluggish motor action and can usually be detected by a slight leak or wet carburetor body.

To correct this trouble, loosen the needle valve collar which is soldered to the needle valve and move the collar up or down until the correct float level position is obtained. Resolder the collar to the needle valve. (See Float Level information in Carburetor Specification section).

Motor Cutting Out on a Pull

Spark Plug Gaps too Wide.—Motor cutting out on a pull may be caused by a too wide spark plug gap setting. (See Spark Plug Gap Setting under Ragged Idle).

Contact Point Gap too Wide.—Motor performance on all Models of Stutz is sensitive to the contact point clearance. A too wide contact point gap will cause the motor to cut out on a hard pull and at high speeds. (See Ignition Timing Table for correct contact point clearance).

Motor Noise

Tight Timing Chain.—A slight squeaking noise at idling speed with increased intensity at higher speeds may be caused by a tight timing chain. If the chain has been replaced by someone unfamiliar with the automatic chain take-up, it is possible that the adjustment is incorrect.

To adjust the spring on the automatic take-up, proceed as follows: With the camshaft properly timed to the motor and the sprocket assembled in place, place the automatic adjusting sprocket into position, holding the sprocket so that all slack is removed from the chain, wind the spiral spring from 1¼ to 1½ turns in a clockwise direction. Enter the spring tongue into the nearest of the slots in the stationary hub.

A camshaft sprocket which has become worn as the result of a loose timing chain will generally cause a noticeable chain whine at all speeds. To correct this trouble, it will be necessary to replace the worn sprocket.

Dry Camshaft.—A distinct tapping or knocking sound, slightly resembling a connecting rod knock, may be caused by an improperly lubricated overhead camshaft. The camshaft should be carefully inspected with the motor running and the cylinder head cover removed.

Failure of the camshaft lubrication may be the result of dirt in the vertical passageway leading from the cylinder block to the overhead camshaft and valve mechanism. When the cylinder head is removed for the purpose of cleaning carbon, a piece of rag or cork of some sort should be inserted in the oil passageway to prevent dirt and carbon plugging up the opening.

If no oil seeps through the metering pin in the heel of the cam, unscrew the metering pin, remove and thoroughly clean.

If no oil enters the camshaft on the camshaft sprocket, remove the timing chain case and carefully clean the vertical passage in the cylinder head and cylinder block.

Water Pump Shaft.—A dry metallic grinding noise at the water pump may be caused by insufficient or no clearance between the end of the pump shaft and the pump housing. To correct this trouble, remove the water pump shaft and grind off the end sufficiently to permit a slight end play.

OIL PRESSURE

The oil pressure data in the following table is for a hot motor with the oil warm

Model and Year	Min.	Max
693-4—1925	18 lbs	30 lbs
Eight—1926-27	5 lbs.	50 lbs.
BB—1928	5 lbs.	50 lbs.
Blackhawk Six, Series L—1929	10 lbs.	50 lbs.
M—1929	5 lbs	50 lbs.
Blackhawk Eight, Series L—1929	10 lbs.	50 lbs.
M—1930	5 lbs.	50 lbs.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition timing data for Stutz automobiles from 1925 to 1930 inclusive.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
STUTZ						
1925	6-95	025″	T C	Ret	018″	1-4-2-6-3-5
1926	AA	025″	T C	½ Adv	022″	1-6-2-5-8-3-7-4
1927	AA	017″	T C	½ Adv	022″	1-6-2-5-8-3-7-4
1928	BB	017″	T C	½ Adv	022″	1-6-2-5-8-3-7-4
1929-30	M	017″	T C	2/5 Adv	022″	1-6-2-5-8-3-7-4
1929	L-6 Blackhawk	017″	T C	2/5 Adv	022″	1-5-3-6-2-4
1929	L-8 Blackhawk	017″	*IGN	Adv	022″	1-6-2-5-8-3-7-4

Adv —Spark lever in fully advanced position Ret —Spark lever in fully retarded position
*Flywheel marked "IGN SET", firing position for No 1 piston with lever at full advance

Stutz Model 6-95 1925.—The contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke. The spark lever should be in the fully retarded position. (See Ignition Timing Table for contact point clearance).

Stutz AA 1926.—The ignition system comprises a double set of spark plugs, two for each cylinder, which fire at the same time; a coil with a single primary winding and a double secondary winding; distributor with four lobe cam and two sets of contact points. One set of contact points is mounted in a fixed position on the distributor plate and the other set is mounted on a movable base.

The movable set of points should just start to separate when piston No. 1 is at top dead center

of the compression stroke with the spark lever in one-half advanced position. (See Ignition Timing Table for contact point clearance).

Stutz Model AA 1927, BB 1928, M 1929.—The ignition systems used on these models comprise a double set of spark plugs, two spark plugs for each cylinder which fire at the same time, two ignition coils, a distributor with an eight lobe cam and two sets of contact points. Before timing the ignition to the motor, the contact points should be synchronized.

To synchronize the contact points, connect a test lamp across each set of points. Adjust the points until both lights go out at the same time.

The points should just start to separate when piston No. 1 is at top dead center of the compression stroke with the spark lever at the one-half advanced position (2/5 advanced on Model M). Ignition contact point gap clearance for all Models of Stutz will be found in the Ignition Timing Table.

Stutz Model L-6 (Blackhawk) 1929.—The ignition systems used on these Models comprise a double set of spark plugs, two for each cylinder which fire at the same time, two ignition coils, a distributor with a six lobe cam and double contact points. Before timing the distributor to the motor, the contact points should be properly synchronized. See information under heading To Synchronize Distributors With Six Lobe Cam (contact points break contact simultaneously).

To time the distributor to the motor, the contact points should just start to separate when piston No. 1 is at top dead center of the compression stroke with the spark level in 2/5 advanced position. (See Ignition Timing Table for contact point clearance).

Stutz Model L-8 (Blackhawk) 1929.—The stationary set of contact points should just start to separate when the flywheel ignition timing mark is under the indicator in the flywheel inspection hole at the top of the flywheel housing. With piston No. 1 on compression stroke, the spark lever should be in the full advanced position. (See Ignition Timing Table for contact point gap clearance).

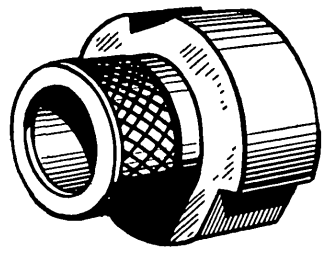
Complete information on how to synchronize the distributor points will be found under the heading To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam.

To Synchronize Eight Cylinder Delco-Remy Distributors With Eight Lobe Cam (contact points open simultaneously).—To synchronize Delco-Remy distributors with two sets of contact arms and an eight lobe cam, connect a test lamp across each set of contact points. Adjust the contact point openings until both test lamps go out at the same time.

To Synchronize Six Cylinder Delco-Remy Distributors With Six Lobe Cam (both sets of contact points open simultaneously).—Connect a test lamp across each set of contact points and adjust so that both lights go out simultaneously when the points are opened.

Fig. 1

Delco-Remy synchronizing tool No. 822572. The contact points are set to break 45° apart of distributor shaft rotation, which is equal to 90° of flywheel travel. To determine the exact instant the contact points separate, a test lamp or test ammeter should be used.



To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (one ignition coil with single primary and double secondary used).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate. The points are arranged to break contact 45° apart of distributor shaft rotation which is equal to 90° of flywheel travel.

Adjust each set of contact points to the correct clearance as given in the Ignition Timing Table. Use synchronizing tool No. 822572, Fig. 1, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station. The distributor shaft cam must be removed in order to use this tool and much time can be saved in retiming the distributor to the motor if the position of the rotor is marked before removing the cam. Turn the rotor against rotation with the fingers to take up the backlash in the gears and mark the position of the rotor with a corresponding mark on the side of the distributor housing, then remove the rotor.

Loosen the lock screws in the center of the cam and remove the cam. Place the synchronizing tool on the shaft in place of the cam and rotate the tool with the fingers or pliers until the contact rubbing block drops into the notches in the side of the tool.

Next loosen the lock screws which hold the movable plate and adjust this plate by turning the eccentric screw with a screwdriver until both sets of contact point rubbing blocks fit evenly against the flat side of the notches in the synchronizing tool.

On earlier production distributor which does not have an adjustable plate and eccentric screw, the entire contact point plate which holds both sets of contact points must be moved until both rubbing blocks fit evenly against the side of the notches in the tool.

Next tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy. Replace the cam and rotor and turn the rotor until the scratch mark is even with the mark on the distributor housing. Remove the rotor and tighten the lock screws in the center of the cam and check the rotor scratch marks again, making sure the rotor is turned against rotation to take up backlash.

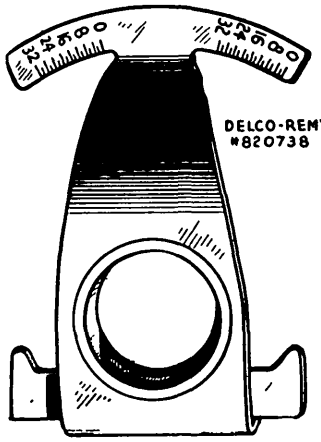


Fig. 2

Delco-Remy synchronizing tool No. 820738. The contact points are set to break 45° apart of distributor shaft rotation, which is equal to 90° of flywheel travel. To determine the exact instant the contact points separate, a test lamp or test ammeter should be used.

To Synchronize Eight Cylinder Delco-Remy Distributors With Four Lobe Cam (one ignition coil used).—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate and arranged to break 45° apart distributor shaft rotation which is equal to 90° of flywheel travel.

Adjust each set of contact points for correct opening as given in the Ignition Timing Table. Use synchronizing tool No. 820738, Fig. 2, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor in the direction of rotation until the contact points on the stationary plate just start to open. The instant the contact points open should be determined by the aid of a test ammeter or test lamp connected in series with the primary circuit. With the switch turned on, the instant the contact points separate, the ammeter needle will return to zero if an ammeter is used or the lamp will go out if a test lamp is used.

Hold the distributor exactly in this position and place the synchronizing tool over the cam and lock in place with the slide pushed through, showing the arrow which points toward the direction of rotation. Scratch a mark on the side of the distributor housing in line with the O° graduation on the scale of the tool which points toward the direction of the distributor shaft rotation.

Rotate the distributor shaft in the direction of rotation without removing the tool until the O° graduation on the opposite side of the tool is even with the first mark made on the distributor housing.

Hold the distributor exactly in this position and adjust the movable plate by loosening the lock screws over the plate and turning the eccentric screw with a screwdriver until the contact points just start to open.

Tighten the screws and set the contact points for correct opening and repeat the entire operation for accuracy.

VALVE TIMING

Stutz Model 6-95 1925.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .008". The exhaust valve should just close 1¼" (flywheel travel) after top dead center of the exhaust stroke for No. 1 piston. (See Valve Timing Table for valve tappet clearance).

Stutz Model AA 1926-27, BB 1928.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .028". The exhaust valve should just close 10° after top dead center of the exhaust stroke for No. 1 piston. The flywheel is marked with valve timing symbol EXCL 1-8. (See Valve Timing Table for tappet clearance).

Stutz Model M 1929-30, L-6 (Blackhawk) 1929.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .028". The exhaust valve should just close 7° after top dead center of the exhaust stroke for piston No. 1. The flywheel is marked with valve timing symbols on Model M, EX-CL 1-8; on Model L-6, EX-1-6 (See Valve Timing Table for tappet clearances).

Stutz Model L-8 (Blackhawk) 1929.—To check the valve timing, set the tappet clearance for No. 1 exhaust valve at .012". The exhaust valve should just close 8° after top dead center of the exhaust stroke for piston No. 1. The flywheel is marked with valve timing symbols EX-CL-1-8. (See Valve Timing Table for tappet clearance).

Valve Timing Table

The following table contains complete valve timing data for all Models of Stutz from 1925 to 1930 inclusive. Tappet clearances are for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
STUTZ								
1925	6-95		.008"	.006"	.008"	1¼"A	..	Closes
1926-27	AA		.028"	.028"	.028"	*10°A	....	Closes
1928	BB		.028"	.028"	.028"	*10°A	...	Closes
1929-30	M		.028"	.028"	.028"	*7°A	..	Closes
1929	L-6 Blackhawk		.028"	.028"	.028"	*7°A	....	Closes
1929	L-8 Blackhawk		.012"	.008"	.008"	*8°A	.. .	Closes

A —After top dead center.
*Flywheel marked for valve timing. Indicator provided at peekhole at top of flywheel housing.

GAS LINE SCREENS

All Models of Stutz equipped with vacuum tank fuel feed have three strainer screens in the gas line from the supply tank to the carburetor. One screen is located in the head of the vacuum tank; a second strainer is located in the gascolator and a third strainer is located at the carburetor.

All Models of Stutz equipped with Oil-Vac fuel feed have a strainer screen in the gascolator and a strainer screen at the carburetor.

Carburetor Specifications

FLOAT LEVEL

Zenith Carburetors

Zenith Model SV5D.—A line is scribed on the outside of the float chamber indicating the proper

gasoline level. The float level should not be above this line and should not fall more than 3/32" below this line. Leaking from the carburetor will, in practically every case be due to dirt under the float needle.

If it should be necessary to change the float level adjustment, raise or lower the collar in which the float lever arm rests. The collar is soldered to the float needle and must be unsoldered in order to make the float level adjustment. Never, under any circumstances, attempt to change the float level by bending the float lever arm.

Zenith Model 105DC.—The fuel in the float bowl will stand at the correct level when the distance from the surface of the gasoline to the top edge of the float bowl is ¾".

If it should be necessary to change the float level, raise or lower the collar in which the float lever arm rests. This collar is soldered to the float needle and must be unsoldered in order to make an adjustment. Never attempt to change the float level adjustment by bending the float lever arm.

CARBURETOR SPECIFICATION DIAGNOSIS

Two models of Zenith carburetor have been used on Stutz from 1926 to 1930 inclusive. On the early models, Zenith SV5D Duplex type carburetors were used. On later models, Zenith 105DC Duplex type carburetors were used. Both models of this carburetor are of the plain tube type with a single low speed adjustment for each barrel of the carburetor.

Zenith Model SV5D.—The only moving parts in this carburetor are the throttle, the float mechanism and the air shutter or choke. The throttles must open fully and close evenly at idling speed to develop the full motor range. This is assured through pinning the throttle lever and securely fastening both the throttles to a single shaft. The float mechanism is a simple device having the needle collar soldered in the correct position.

The air shutter or choke should be adjusted to close and to open wide when manipulated from the dash. The choke should be used momentarily when starting the engine but the choke should, in every case, be returned to the normal running position as soon as possible without causing the engine to miss. Slow starting and low gasoline mileage can usually be traced to improper manipulation of the choke. The carburetor dash control button is in its normal running position when pushed forward as far as it will go.

Since all jets and passageways are of the fixed size, specification information consists chiefly of a thorough inspection of all parts for dirt or wear.

Inspection Instructions

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, thoroughly wash and clean in gasoline.

An accumulation of dirt and water may cause leaking through particles lodging under the needle valve. Spitting and lack of speed may be caused by the main jets becoming clogged with dirt. Spitting and lack of acceleration may be caused by clogged compensators. (See compensators below). Faulty idling, due to plugged idling jets may also result from dirt. All jets may be removed and cleaned without affecting the carburetor adjustment. However, a wire or other hard material should never be forced through any of the jet openings since there is danger of changing the size of the jets or fuel opening.

Zenith Model 105DC

The only moving parts in this carburetor are the throttle, the float mechanism, the air shutter or choke and the accelerating pump plunger. The throttle must open fully and close evenly at idling speed to develop the full motor range. This is assured by pinning the throttle lever and accurately fastening both throttles to a single shaft. The float mechanism is of the single hinge type. There are only two moving parts and the design practically eliminates wear. This construction holds the needle valve from turning, thus eliminating wear at the needle valve seat. The enriching valve and accelerating pump are described in separate paragraphs below.

Main Jets.—Each barrel of the carburetor has a main jet (G) Fig. 3, which supplies the combustible mixture to the cylinders throughout the greater part of the operating range of the engine. There is an unrestricted channel leading from the float chamber to these jets.

Compensators.—There are two compensator jets or restrictions for each barrel of the carburetor. The idle compensator (I), Fig. 3, forms

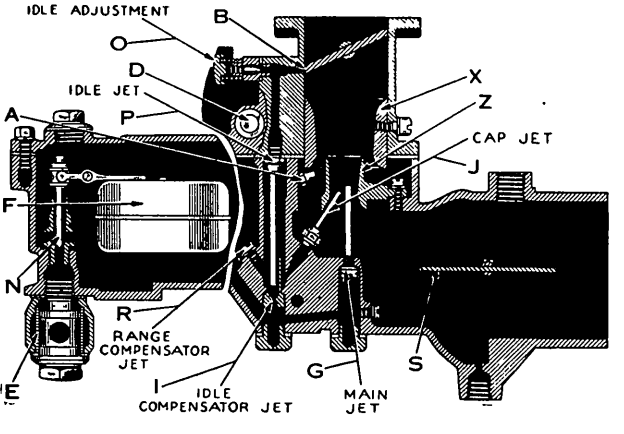


Fig. 3

Cross sectional view of Zenith Model 105DC carburetor used on late model Stutz automobiles. One adjustment is provided on these carburetors as shown at (O). (A) Accelerating pump; (B) idle passage hole; (D) air screen; (E) filter screen; (F) float; (G) main or high speed jet; (I) idle compensator; (J) cap jet; (N) float needle valve; (O) adjusting screen; (P) idle jet; (R) range compensator; (S) choke valve; (X) primary venturi; (Z) secondary venturi.

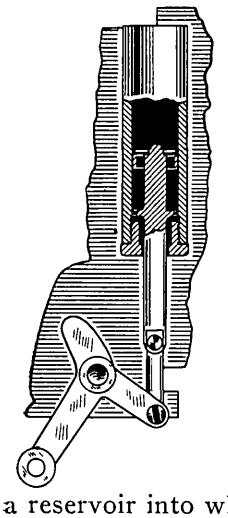


Fig. 4

Cutaway sectional view of carburetor accelerating pump used in Zenith Model 105DC carburetor used on Stutz automobiles. The pump plunger is linked to the throttle control and the pump cylinder is supplied with gasoline by a passage from the float chamber. When the throttle is opened quickly, the pump plunger forces gasoline into a pump discharge chamber, which in turn sprays gasoline into the carburetor barrels through the accelerating jets, which are located above the float level, one in each barrel. Closing the throttle will cause the pump plunger to suck back any fuel remaining in the discharge chamber, thus preventing flooding of the manifold with excess gasoline during acceleration.

a reservoir into which the idle jet (P) dips. The idle compensator (I) supplies fuel to the idle jet (P) and is augmented at low speeds by fuel from the range compensator (R) which overflows the top of the well formed by the compensator jet (I). At driving speeds, the engine suction will take the entire flow of gasoline from the range compensator (R) and the overflow of gasoline from the idle compensator (I) through the cap jet (J).

Idling Jets.—The idling jets (P) dip into the well formed by the idling compensators (I), Fig. 3. When the throttle valve is very nearly closed, the velocity of the mixture past the throttle is very high and this high velocity creates a partial vacuum in the drilled idling passages which empty into the carburetor barrel at (B). This suction lifts gasoline through the iding jet (P) and mixes the gasoline with the air which passes the adjustable idling needle (O) and through the two 1/16" constant air openings which are drilled through the sides of the carburetor body into the idling passages. When the throttle is opened sufficiently for normal road use, the velocity of the mixture past the opening (B) is so low that very little or no gasoline enters the carburetor barrel from the idling passages.

Accelerating Pump.—An accelerating pump plunger, Fig. 4, is linked to the throttle control and the pump cylinder is supplied with gasoline by a passage from the float chamber. When the throttle is opened quickly, the pump plunger forces gasoline into a pump discharge chamber which in turn sprays the gasoline into the carburetor barrels through the accelerating jets (A), Fig. 3, which are located above the float level, one in each carburetor barrel.

There is an air vented nozzle at the top of the drilled discharge chamber. This nozzle stands between the two idle adjusting needles (O) and is not adjustable. The capacity of the accelerating pump is greater than the capacity of the pump discharge chamber and extra gasoline forced into the chamber by quickly opening the throttle will overflow into the discharge chamber and return to the float chamber past the air vent. As long as the throttle is held open, a column of gasoline will be maintained in the discharge chamber until it is used up by the pump accelerating jets. Closing the throttle will cause the pump plunger to suck back any fuel remaining in the discharge chamber, thus preventing flooding of the manifold with extra gasoline during deceleration.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
STUTZ					ZENITH
1926	Eight ..	Own	8	3 1/16"x4 1/2"	SV5D-1 1/4"
1927	Eight .. .	Own	8	3 1/4"x4 1/2"	(2) 105DC-1 1/4"
1928	BB	Own	8	3 1/4"x4 1/2"	105DC-1 1/4"
1929	Blackhawk 6, Series L	Own	6	3 3/4"x4 1/2"	105DC-1 1/4"
1929	M	Own	8	3 3/8"x4 1/2"	105DC-1 1/4"
1929	Blackhawk 8, Series L	Cont.	8	3 "x4 3/4"	105DC-1 1/4"
1930	MA, MB .	Own	8	3 3/8"x4 1/2"	105DC-1 1/4"

ZENITH MODEL SV5D

The Stutz Zenith Model SV5D carburetor is a Duplex instrument comprising two 1 1/4" carburetors fed by one fuel chamber similar in construction to the carburetors used almost universally in aviation. The inside barrel supplies the middle four cylinders while the outside barrel feeds the two cylinders on each end of the motor block. This carburetor is of the plain tube type, adjusted accurately at the factory. No further adjustment should be required throughout the life of the carburetor except that of the low speed or idle adjustment which is provided for each barrel of the carburetor.

Idle Adjustment.—No attempt should be made to change the idle adjustment until after the ignition timing has been checked, the distributor contact points cleaned and adjusted and the spark plugs cleaned and adjusted. The compression pressure on each cylinder should also be checked and any possibility of leaking through the valves eliminated. The valve lash should be checked and correctly adjusted. The engine should then be thoroughly warmed up before proceeding with the idle adjustment.

Adjust the butterfly lever stop screw so that the engine idles as smoothly and slowly as possible, then turn in or out on the two idle needle valves manipulating one needle at a time until the engine runs evenly. Backing the needle out too far will cause the motor to stop due to a lean mixture while turning the needle in to the right too far will have the same effect due to a rich mixture. The best adjustment will be obtained when the average between these two points is reached and the motor runs smoothly.

For the average jobs the adjustment will be correct when the needle on the inside barrel is backed out approximately one turn and the needle on the outer barrel is backed out approximately three-fourths of a turn from its seat.

ZENITH MODEL 105DC

The Blackhawk Zenith carburetor is a Duplex instrument comprising two 1¼" carburetors fed by one fuel chamber similar in construction to the carburetors used almost universally in aviation. This carburetor is of the plain tube type adjusted accurately at the factory. No further adjustment should be required throughout the life of the carburetor except that a low speed adjustment is provided on each barrel of the two carburetor barrels.

Idle Adjustment.—No attempt should be made to change the idle adjustment until after the ignition timing has been checked, the distributor contact points cleaned and adjusted and the spark plugs cleaned and adjusted. The compression pressure on each cylinder should also be checked and any excessive leaking through the valves should be corrected. The engine should then be thoroughly warmed up before proceeding with the idle adjustment.

Adjust the butterfly lever stop screws so that the engine idles as smoothly and slowly as possible, then turn in or out on the two idle needle valves, Fig. 3, manipulating one needle at a time until the engine runs evenly. Backing the needle out too far will cause the engine to hesitate from a lean mixture while turning the needle in too far will cause the motor to hesitate from a rich mixture. The best adjustment will be obtained when a point between these two extremes is reached and the motor is running smoothly. After the idle adjustment operation is complete, reset the throttle stop screw until the motor idles at the desired speed.

Viking 1929-30

Motor Tune-Up

As a rule when a Viking automobile is brought in for motor tune-up, it will generally be found that someone has tampered with the spark plug or distributor contact point setting or has changed the carburetor adjustment or specifications.

A wide spark gap can generally be indicated on a pull or fairly steep hill by the car missing a few times and then hanging on one plug. By that is meant that the car will miss all the way up the hill on one cylinder. If this condition exists, spark plug trouble is indicated.

If the trouble is due to improper synchronization of the contact points, the trouble will generally be indicated by an erratic missing or rough running at idling speeds, the symptoms of which are very similar to a rich carburetor mixture and should not be confused with carburetor trouble.

If trouble is experienced in tuning the motor, read closely the special information found immediately following the tune-up operations and also the inspection information in the Carburetor Specification Diagnosis section.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
2. Synchronize distributor points.
3. Check the ignition timing; adjust if necessary.
4. Check valve tappet clearance; adjust if necessary.
5. Clean gas line strainers and screens; also check gas lines for loose fittings.
6. Check fan and generator belts; adjust if necessary.
7. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
8. Check heat control valve.
9. Check throttle valve for opening.
10. Check choke valve for position.
11. Check manifold gaskets; see that all manifold flange nuts are tight.
12. Check high tension wiring.
13. Adjust carburetor.
14. Road test car.

Note: The ignition should never be advanced beyond the point where a spark knock occurs except under full load conditions.

Ragged Idle

Ignition Timing Not Properly Synchronized.—A poor idling condition may be caused by the double breaker arms not being properly synchronized. The symptoms are similar to those caused by a too rich carburetor mixture and are especially noticeable at idling speed.

To correct this trouble, synchronize the breaker points as described under Ignition Timing.

Warped Carburetor Flange.—A poor idling condition may be caused by a warped carburetor flange as the result of tightening the carburetor against the manifold unevenly. Extreme care should be exercised when bolting the carburetor to the intake manifold to see that both sides come up evenly. The carburetor flange should be checked with a straightedge and if it is found to be warped, square up with a flat mill file.

Spark Plug Gap Setting.—A poor idling condition may be the result of spark plug gaps that are improperly spaced. The spark plug gaps should be set to a clearance of not less than .025″ nor more than .030″.

Lack of Power

Timing.—Lack of power and poor motor performance may be caused by incorrect ignition or valve timing. Check both ignition and valve timing and make sure that the contact points and spark plug gaps are properly spaced.

Carburetor.—When tuning a motor, the carburetor is the last unit that should be checked. Do not, under any consideration, change or tamper with the carburetor until after the ignition and valve timing and motor compression have been checked. See that the valve tappets have sufficient clearance, that the spark plug gaps and breaker points are correctly spaced and that the contact breaker arms are properly synchronized.

If the trouble is finally traced to the carburetor, first make sure that the carburetor has been properly adjusted. (See Carburetor Adjustment instructions in the Carburetor Adjustment section). If the trouble still persists, remove and thoroughly clean all jets and passageways and when reassembling the carburetor to the manifold make sure that there are no air leaks at the manifold flange gaskets.

Low Gasoline Mileage

High Float Level.—Low gasoline mileage may be caused by a high fuel level in the bowl as the result of an improper float adjustment. The float level should be checked and if found to be too high, reset to the correct level.

As a rule, in extreme cases where the float level is too high, a slight leak may be noticed around the body of the carburetor. (See Float Level Adjustment in Carburetor Specification section).

Leaky Carburetor Float Valve.—Poor gasoline mileage may be caused by a leaky carburetor float valve which results in raising the fuel level. This trouble is generally caused by a combination of a leaky float valve and fuel pump pressure. To correct, replace the needle valve and seat with new ones.

Motor Cutting Out on a Pull

High Tension Wiring.—Motor missing or cutting out on a pull may be caused by loose high tension wires either at the distributor or the coil.

Examine the ends of the high tension wires at the terminals to see that the wires are not burned away up into the insulation. When the wires work loose in the terminals of the distributor shaft or at the coil the continuous arcing of the current burns away the wires thus placing a high resistance in the high tension circuit which may cause the motor to miss.

Distributor Breaker Arms.—Motor missing or cutting out on a pull may be caused by sluggish action of one of the distributor arms. This trouble is generally caused by corrosion or lack of lubrication on the distributor arm pin. Make sure that both distributor arms are free and properly adjusted. Put a drop of light oil on the pin to maintain its free action.

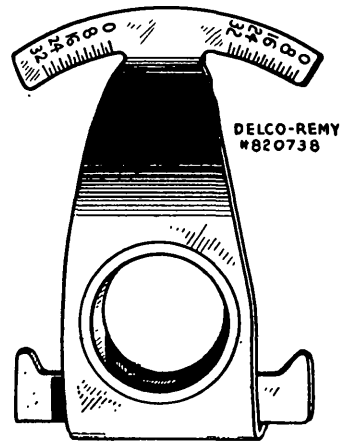


Fig. 1
View of Delco-Remy synchronizing tool No. 820738 used to synchronize distributors used on eight cylinder Viking automobiles.

OIL PRESSURE

Model and Year	Min.	Max.
V-8—1929-30	10 lbs.	30 to 35 lbs.

IGNITION TIMING

Ignition Timing Table

The following table contains complete ignition data for Viking 1929-30 models.

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Piston Travel	Spark Lever Position		
VIKING 1929-30	V-8	.018"-.024"	.055"B	Adv.	.025"	1R-1L-4R-2R 2L-3R-3L-4L

B.—Before top dead center. Adv.—Spark lever fully advanced.

Viking V-8 1929-30.—The ignition distributors used on Viking motors have two sets of breaker contacts; one set is mounted on the breaker plate base and is called the stationary set of contacts; the other set is mounted on a sub base and is called the movable set of contacts. To time the distributor to the motor, crank the engine until piston No. 1 is .055" before top dead center of the compression stroke. At this point, the stationary set of contact points should just start to separate. Piston No. 1 is the piston in the first cylinder nearest the radiator in the right hand bank. There are no timing marks provided on the flywheel rim so that all timing operations must be done with the aid of a piston timing gauge.

The spark lever should be in the fully advanced position when timing the motor. (See Ignition Timing Table for contact point gap clearance).

To Synchronize Eight Cylinder Distributors With Four Lobe Cam.—This distributor has a four lobe cam and two sets of contact points. One set is mounted on a stationary plate and the other set is mounted on a movable plate arranged to break 45 degrees apart of distributor shaft rotation which is equal to 90 degrees of flywheel travel. One ignition coil is used.

Adjust both sets of contacts to a clearance of from .018" to .024" preferably .022". Use synchronizing tool No. 820738, Fig. 1, which can be obtained at any United Motor Service branch or authorized Delco-Remy service station.

Rotate the distributor in the direction of rotation until the contact points on the stationary plate just start to open. The exact instant the points start to open should be determined by the aid of a test ammeter or lamp connected in series with the primary ignition lead. With the switch turned on, the ammeter needle will drop back to zero or the lamp will go out the instant the points open. With the distributor shaft exactly in this position, place the synchronizing tool over the distributor shaft cam and lock into place with the slide pushed through showing the arrow which points toward the direction of rotation. Scratch a mark on the side of the distributor housing in line with the zero degree graduation on the side of the tool which points toward the direction of the distributor shaft rotation. Rotate the distributor shaft in the direction of rotation without moving the tool until the zero graduation on the opposite side of the tool is even with the first mark made on the distributor housing. Holding the distributor shaft exactly in this position, adjust the movable plate by loosening the lock screws over the plate and turning the eccentric screw with a screwdriver until the contact points just start to open. Tighten the lock screws, check the contact points for correct opening and repeat the entire operation for accuracy.

VALVE TIMING

Viking V-8 1929-30.—No flywheel marks are provided on the flywheel for timing the valves. The piston timing position must be located by the use of a piston travel gauge. Adjust the tappet clearance for No. 1 intake valve at .010". The intake valve should just start to open when piston No. 1 is at top dead center of the exhaust stroke. Piston No. 1 is the piston in the cylinder nearest the radiator in the right bank. After the timing operation is complete, reset the valve tappets to the correct clearance. (See Valve Timing Table).

Valve Timing Table

The following table contains complete valve timing data for all Models of Viking 1929-30. Valve tappet adjustment clearances are given for hot motor unless otherwise designated.

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING			
		For Timing		Running		Fly-Wheel Travel	Piston Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.				
VIKING 1929-30	V-8	010″		008″	010″		T C	Opens	

T C —Top dead center.

GAS LINE SCREENS

All Models of Viking 1929-30 are equipped with fuel pump feed and have two gas line strainers in the gasoline system from the fuel tank to the carburetor. One screen is located in the top of the fuel pump bowl and the other is located at the carburetor. To clean the gas line screen in the top of the fuel pump bowl, Fig. 2, remove the bowl and wash the screen in clear gasoline. When the bowl is replaced, make sure that the gasket between the glass bowl flange and the fuel pump body is in good condition and tight.

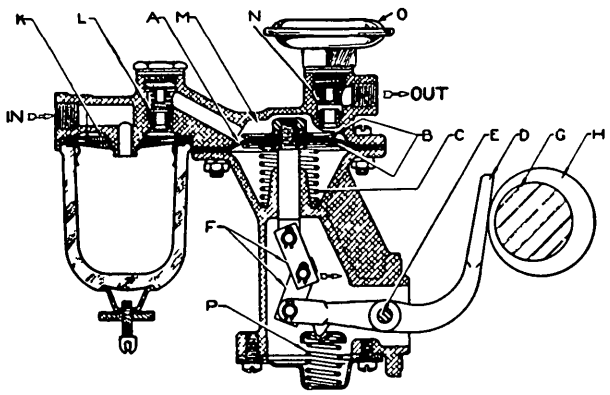


Fig. 2

Cross sectional view of fuel pump, glass bowl and pump valve. Note the two strainer screens and position of cork gasket at the top of the glass bowl. The valve disc is held in position by a spring which in turn is held in place by the valve plug. If the valve plug is removed, see that the valve plug gasket is in good condition when the plug is replaced.

Carburetor Specifications

FLOAT LEVEL

Johnson Carburetors

All Models of Viking 1929-30 have come equipped with Johnson Model R 1½″ carburetors. The fuel will stand at the correct level in the float bowl when the distance from the machined flange of the carburetor body to the bottom of the float with the float needle in the seated position measures 1¼″. (See Fig. 3).

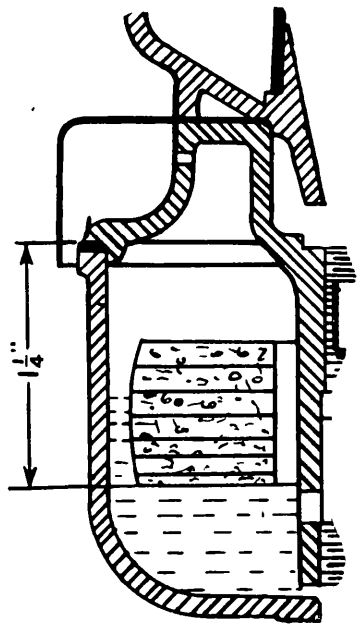


Fig. 3

Sectional view of Johnson carburetor showing points at which the float level should be measured. The float encircles the lower portion of the diaphragm body and the float measurement should be taken from the lower surface of the float to the milled flange of the carburetor body as shown.

If it should be necessary to change the float level, bend the float lever arm either up or down until the correct level is obtained.

CARBURETOR SPECIFICATION DIAGNOSIS

The following paragraphs contain carburetor specification information for Johnson Model R carburetors used on Viking automobiles.

JOHNSON CARBURETORS

Johnson carburetors used on Viking automobiles are of the plain, air valve type provided with an economizer, accelerating pump, cold priming device and an interconnected throttle and choke. The fuel mixture is controlled chiefly by the action of an automatic air valve which takes care of the carburetor through its full range of operation. Each carburetor is correctly calibrated at the factory; therefore, the jet specification information consists chiefly of inspecting the carburetor for dirty or plugged up passageways and openings and worn parts.

Occasionally jobs will be encountered where someone unfamiliar with Johnson carburetors has tampered with the calibration specification by drilling out the economizer tube or by changing or stretching the air valve spring. Under no consideration should these parts be changed or tampered with in any way.

Inspection Instructions

In cases where trouble is experienced in obtaining a correct adjustment or where the car owner complains of lack of mileage, hard starting, etc., remove the carburetor from the car, thoroughly wash and clean in gasoline and inspect as follows.

Warped Carburetor Body Casting.—Inspect the milled surfaces of the upper and lower body flanges, where the two halves of the carburetor are bolted together to see that these flanges are not warped or distorted in any way.

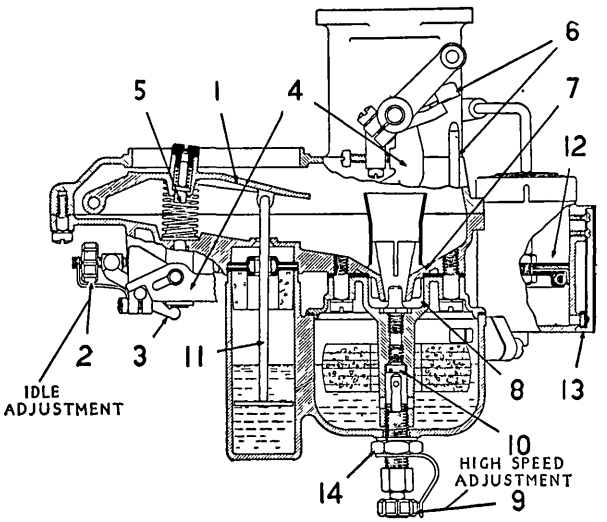


Fig. 4

Cross sectional view of Johnson Model R carburetor used on Viking automobiles. This carburetor has an idle adjustment (2), high speed adjustment (9), which operates to control the flow of gasoline through the main nozzle, an economizer device (6), an accelerating pump (12), which is controlled for varying temperature conditions by the thermostat (13).

If the upper body flanges are warped, it may distort the air valve seat, causing a leak at the air valve and thus throwing the carburetor adjustment out of balance.

Warped or distorted body flanges may be checked out by the use of a feeler gauge inserted between the upper and lower halves of the body before the carburetor is dismantled or by using a straightedge on the face of the flange after the lower half of the body has been removed. To correct this trouble, replace the carburetor body

Air Valve Spring.—The air valve spring (5), Fig. 4, is a calibrated part and should not be stretched or tampered with in any way. Weak air valve springs will be most noticeable at high speeds, causing a lean mixture. If when the carburetor is overhauled or dismantled for cleaning there is any doubt as to the condition of the air valve spring, it should be replaced with a new part.

Economizer Tube.—The purpose of the economizer is to admit an air stream into the middle of the gasoline flow for economy. The economizer tube (6), Fig. 4, and (48), Fig. 5, conducts air into a drilled passageway leading to the chamber lying between the spray needle seat and the jet (51), Fig. 5. At this point the air is mixed with gasoline flowing upward through the jet. The economizer is open at idle and all throttle positions and car speeds up to approximately 55 miles per hour. As the engine speed increases, the rate of air flow increases more rapidly than does the rate of gasoline flow, gradually bringing about a leaner condition, requiring that the air leaks through the economizer be stopped, thus transferring the vacuum directly to the high speed spray jets for open throttle conditions. At higher speeds or when additional power is required at low speeds, the opening motion of the throttle lever produces a rotation of the throttle valve cross shaft and causes the economizer lever and cap assembly (6), Fig. 4, floating on this shaft to rotate by means of a coil spring to a position such that the cap closes the opening in the upper end of the economizer tube. Additional opening of the throttle does not further affect the action of the economizer.

Jobs may be encountered where someone unfamiliar with Johnson carburetors has drilled out the economizer tube opening, which is a calibrated part. On the base of each economizer tube, stamped on the hexagon nut portion, a number will be found which corresponds to the wire drill size of the tube. If trouble is experienced with the motor loading or difficulty is encountered when attempting an adjustment, check to see that the opening in the economizer tube corresponds with the drill size stamped on the base of the tube.

Air Valve.—The air valve should be inspected for wear and loose hinges. When the motor is not running the air valve is closed, but when the motor is in operation the air valve is continually off its seat and operates automatically to supply the requirements of the engine. If the hinges are excessively worn or loose, the air valve may not operate correctly and thus upset the balance of the carburetor.

Stabilizer Piston.—The automatic air valve is stabilized by a dash pot consisting of a brass piston operating in a well of gasoline. (See Fig 4) The piston is connected to the air valve by a plunger rod (11). The lower end of the stabilizer well is closed and the well is kept filled with gasoline by a drilled hole leading from the float chamber. The piston fits loosely in the dash pot and permits gasoline to flow slowly from above the plate to below and vice versa. A flat brass washer and a cup-shaped washer between which is a felt washer loosely around the plunger rod at the top of the dash pot. A floating cup-shaped brass washer lying above these three washers acts to exclude dust. The space above the washer is opened to the atmosphere. The action of the piston in the gasoline filled well provides a retarding force, preventing fluttering of the air valve, particularly on open throttle and low speeds.

When the carburetor is dismantled for any purpose, the stabilizer piston assembly and washer should be inspected to see that they are in good condition.

Accelerating Pump.—The accelerating pump (12), Fig 4, is an integral part of the carburetor and is located on the side of the carburetor body. The pump is in effect a single acting air pump in which a leather piston ex-

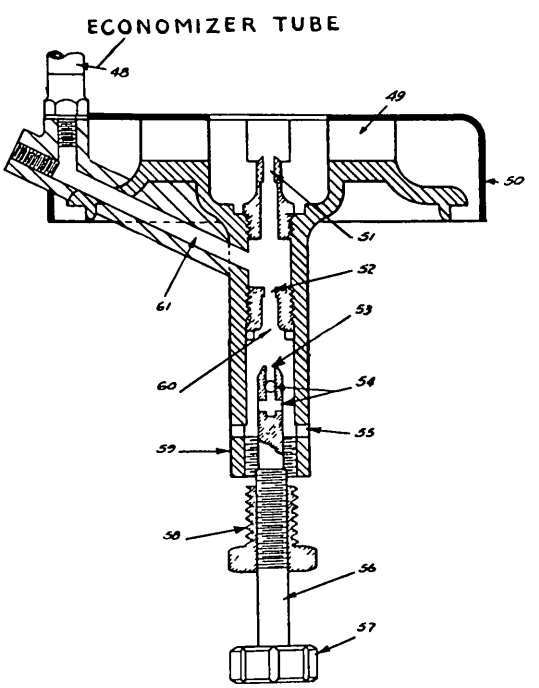


Fig. 5

Cross sectional view of diaphragm of Johnson Model R carburetor used on Viking automobiles, showing economizer tube and location of the gasoline or high speed adjustments. The economizer tube admits air to the chamber between the spray needle seat and the jets (51) by means of the connecting passageway (61). For more complete information see Economizer Tube in Carburetor Specification Diagnosis section.

panded by a coil spring and supported by suitable washers is actuated by a plunger rod connected to a lever mounted on the throttle valve cross shaft. The piston slides in the cylinder, which is open to the atmosphere at the top and connected to an air passage leading into the upper part of the float chamber bowl.

Air is forced on the down stroke of the pump into the air space at the top of the float chamber. Under normal conditions, the pressure on the gasoline in the float bowl is atmospheric, due to the leakage of air through the air bleed. This pressure is increased temporarily whenever the plunger in the pump is quickly forced down by quickly opening the throttle. The action of the increased pressure in the float chamber causes a sudden increase of the rate at which the gasoline is forced to the nozzle slightly ahead of the air stream through the automatic air valve. When the throttle is opened slowly, the air in the pump is forced out through the air bleed instead of into the float chamber so that the accelerating pump does not have any effect upon the mixture.

On Model R carburetors a thermostat control (13), Fig. 4, is used to regulate the action of the accelerating pump according to temperature conditions. This device provides a hole leading out of the lower end of the accelerating pump chamber, bleeding the air which otherwise would be forced into the float chamber. This hole is automatically opened and closed by a felt button attached to the lower end on a thermostatically controlled arm. The action is such that the button uncovers the hole as the operating temperature rises and closes it when the temperature is low.

If trouble is experienced on acceleration with cars equipped with Johnson Model R carburetors, check to see that the accelerating pump thermostat is working correctly. If the thermostat is found to be defective, replace with a new unit.

Carburetor Adjustment

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
VIKING					JOHNSON
1929	V-8	Own	8	3 3/8" x 3 5/8"	R-1 1/2"
1930	V-8	Own	8	3 3/8" x 3 5/8"	R-1 1/2"

Complete carburetor adjustment information for Johnson Model R carburetors used on Viking automobiles will be found in the following paragraphs.

If trouble is experienced in obtaining a correct carburetor adjustment after all tune-up recommendations have been checked, turn to the Carburetor Specification Diagnosis section for more information.

JOHNSON R

The adjustment procedure for Johnson Model R carburetors used on Viking automobiles will be found in the following paragraphs. Two adjustments are provided as shown in Fig. 4; one is an idle adjustment and controls the action of the carburetor at low speeds. The other is a gasoline adjustment and controls the action of the carburetor at high speeds.

High Speed Adjustment.—After the motor has been thoroughly warmed up, set the hand throttle so that the motor is running at approximately 30 miles per hour. Screw in the high speed adjustment (9), Fig. 4, until the motor runs rough from a lean mixture and then back off the adjustment until the motor just smooths out.

Next gradually retard the throttle until the motor slows down to approximately 20 miles per hour and with the motor running at this speed, make the idle adjustment.

Idle Adjustment.—To adjust the carburetor for idling speeds, have the motor thoroughly warmed up. Turn the idle adjustment (2), Fig. 4, out until the motor hesitates from a lean mixture; then turn the adjustment in until the motor just smooths out.

If difficulty is experienced in obtaining an idle adjustment, check to see that the air valve spring is not weak or defective.

Willys-Knight 1925-30

Motor Tune-Up

When tuning a Willys-Knight motor special care should be exercised in adjusting the spark plug and contact point gap clearance and ignition timing. In most instances of poor motor performance the trouble can be traced to improper adjustment of these units.

Special tune-up information will be found immediately following the Tune-up Operations. If someone has tampered with the carburetor, see Carburetor Specification Diagnosis section.

Tune-Up Operations

1. Clean and adjust distributor and spark plug points.
   Note: Spark plug point clearance should not exceed .022". If points are set to a wider gap there is danger of the spark jumping across from the spark plug to the wall of the cylinder head.
2. Check timing chain for slack; adjust if necessary.
3. Check ignition timing; adjust if necessary.
   Note: Ignition timing should be set by flywheel marks.
4. Clean gas line strainers and screens; also check gas lines for loose fittings.
5. Check fan belt; adjust if necessary.
   Note: The fan is mounted on the end of the pump shaft, therefore care should be exercised not to get the fan belt too tight, otherwise there is danger of wearing out the pump shaft bushing.
6. Tighten water pump nut; this operation is only necessary when packing gland is leaking.
7. Check throttle valve opening.
8. Check choke valve for position.
9. Check manifold gasket; see that all manifold flange nuts are tight.
10. Check high tension wiring.
    Note: See that all high tension wiring connections are tight.
11. Adjust carburetor.
    Note: If difficulty is experienced in obtaining a correct carburetor adjustment, check to see that the high speed nozzle is tight. This can be done by removing the high speed adjusting needle and tightening the jets with a screwdriver.
12. Road test car.

Ragged Idle

Air Leaks at Carburetor Flange.—A poor idling condition may be caused by a warped carburetor flange. When this condition exists, air will be admitted into the manifold above the carburetor, thus upsetting the balance of the carburetor adjustment. To check for this trouble, use a squirt can full of oil. If the gasket between the carburetor and manifold flange leaks, a change in motor operation will be noticed when oil is squirted over the flange.

To correct this trouble, remove the carburetor from the manifold and square up the flange with a flat mill file.

Air Leaks Around Throttle Shaft. — A poor idling condition may be caused by a badly worn throttle shaft. To correct this trouble, replace the old throttle shaft with a new one and install new cork gasket.

Leaky Oil Rectifier Connection.—A poor idling condition may be caused by an air leak either at the rectifier or at the manifold of the oil rectifier suction line from the manifold to the rectifier. An air leak may also occur at the connection from the rectifier to the manifold of the motor. These air leaks are difficult to locate and when a poor idling condition is encountered, make sure that all rectifier connections are absolutely tight.

Dirty or Plugged Up Idling Jets.—A poor idling condition may be caused by dirt lodging in the idle discharge opening at the throttle valve. When this condition is encountered, the carburetor should be removed from the manifold, dismantled and all jets and passageways thoroughly cleaned. Wash the carburetor in clean gasoline and blow clear with air.

Dirty Idling Tube Screen.—A poor idling condition may be caused by dirty or plugged up idling tube screen. When this condition is encountered, the idling tube and screen should be removed and thoroughly cleaned in clear gasoline and air.

Poor Acceleration

Low Motor Compression. — Poor acceleration may be caused by low motor compression as a result of the head rings sticking in the grooves. The best method for locating this trouble is with a motor compression gauge. If the compression pressure is found to be lower than 90 lbs., the head rings will probably be found to be stuck.

Exhaust Port Clogged.—Poor acceleration may be caused by dirty or corroded sleeve valve ports. To check for this condition, remove the exhaust manifold and clean the exhaust ports.

Improper Float Level Setting.—Poor motor acceleration may be caused by a high fuel level due to an improper float level adjustment. This trouble will generally be indicated either by a gasoline leak at the carburetor or the motor Rolling and loading on acceleration.

To correct a condition of improper float level adjustment, remove the carburetor bowl cover and bend the float lever arm either up or down until the correct fuel level is obtained. (See Float Level Adjustment). When making a float level adjustment, extreme care should be exercised to see that the float lever arm is not bent in such a manner that the full range of float movement is altered.

Low Gasoline Mileage

High Float Level Adjustment.—A high fuel level due to an improper float level adjustment will cause a loss in gasoline mileage. (See Float Level Adjustment in Carburetor Specification section).

Improper Ignition Timing.—In order to obtain best motor efficiency the ignition timing must be absolutely correct. The ignition timing should be set by flywheel marks only.

Motor Cutting Out on a Pull

Cutting out on a pull may be caused by a too wide spark plug gap, which causes the spark to jump from the spark plugs to the walls of the cylinder head. Cutting out of the motor may also be caused by a loose or defective condenser.

OIL PRESSURE

Willys-Knight Model 1925-26-27, the oil pressure should be set at approximately 15 lbs. minimum and 30 lbs. at 30 miles per hour.

Willys-Knight Model 1928-29-30, the oil pressure should be set at 15 lbs. minimum and 35 lbs. maximum.

IGNITION TIMING

Ignition Timing Table

The following table contains ignition timing data for all Models of Willys-Knight from 1925 to 1930 inclusive

Year	Model	IGNITION TIMING			Plug Gap	Firing Order
		Con. Pt. Clear	Fly-Wheel Travel	Spark Lever Position		
WILLYS-KNIGHT						
1925	67	018″	T C	⅓ Adv	025″	1-3-4-2
1925	66	018″-020″	*8°B	Adv	025″	1-5-3-6-2-4
1926	70	020″-024″	*8°B	Adv	025″	1-5-3-6-2-4
1926	Great 6 (66)	018″-020″	*8°B	Adv	025″	1-5-3-6-2 4
1927	70	020″-024″	*8°B	Adv	025″	1-5-3-6-2-4
1927	66	018″-020″	*8°B	Adv	025″	1-5-3-6-2-4
1928	56	020″-025″	*8°B	Adv	025″	1-5-3-6-2-4
1928	70A	020″-025″	*8°B	Adv	025″	1-5-3-6-2-4
1928	66A	018″-020″	*12°B	Adv	025″	1-5-3-6-2-4
1929	70B	020″-025″	*8°B	Adv	025″	1-5-3-6 2-4
1929	66B	018″-020″	*8°B	Adv	025″	1-5-3-6-2-4
1930	Willys Six	018″-020″	T C	Adv	025″	1-5-3-6-2-4
1930	70B	020″-025″	*8°B	Adv	025″	1-5-3-6-2-4
1930	66B	018″-020″	*16°B	Adv	025″	1-5-3-6-2-4

Adv —Spark lever fully advanced B —Before top dead center
T C —Top dead center
*Flywheels are marked for ignition timing with the symbol "IGN" indicating firing point of pistons No 1 and No 6, indicator is at clutch inspection hand hole in flywheel housing, except Models 66 and 66A with peekhole in left motor leg.

Willys-Knight Model 67 1925.—The contact points should just start to separate when piston No. 1 is at top dead center of compression stroke. The spark lever should be set at one-third advance. (See Ignition Timing Table for contact point gap clearance).

Willys-Knight All Six Cylinder Models 1925-30.—The contact points should just start to separate when the flywheel mark IGN registers with the indicator in the peekhole of the flywheel housing with piston No. 1 on compression stroke. The spark lever should be set at full advance. (See Ignition Timing Table for contact point gap clearance).

On all six cylinder models except Models 66 and 66A the flywheels are stamped with ignition timing marks, which are visible through the clutch inspection hand hole in the flywheel housing. On Models 66 and 66A the flywheels are stamped with ignition timing marks and the marks are visible through the peekhole in the front side of the left motor leg.

Willys Six 1930.—The contact points should just start to separate when piston No. 1 is at top dead center of compression stroke. The spark control should be at full advance. (See Ignition Timing Table for contact point gap clearance).

VALVE TIMING

Willys-Knight All Models 1925-30 (Sleeve Valve Motors).—To check the sleeve valve timing, remove the small pipe plug in the exhaust manifold for port No. 1. (If a plug is not provided it will be necessary to remove the exhaust manifold). Crank the motor until No. 1 piston is coming up on exhaust stroke and the port is opened. Insert a .003″ feeler gauge into the exhaust port and continue cranking slowly until the port just closes on the feeler. At this point the flywheel mark E.C. should be at the indicator provided in the clutch inspection hand hole in the flywheel housing. (Models 66 and 66A have an indicator at the peekhole in the front side of the left motor leg).

Willys Six (Poppet Valve Motors).—To check the valve timing, set the tappet clearance for No. 1 intake at .008″. The intake valve should just start to open when the flywheel mark I.O. is at the indicator in the flywheel housing with piston No. 1 on exhaust stroke. After the timing operation is complete, reset the valve tappets to the correct clearance. (See Valve Timing Table for tappet clearance).

Valve Timing Table

The following table contains valve timing data for sleeve valve and poppet valve motors used in Willys-Knight automobiles The tappet clearance for poppet valve motors given in the following table is for hot motor unless otherwise designated

Year	Model	TAPPET ADJUSTMENT				VALVE TIMING		
		For Timing		Running		Fly-Wheel Travel	Int. Valve	Exh. Valve
		Int.	Exh.	Int.	Exh.			
WILLYS-KNIGHT								
1925	67					T C		Closes
1925	66					T C		Closes
1926	70					*5°A		Closes
1926	Great Six					*5°A		Closes
1927	70					*5°A		Closes
1927	66					*5°A		Closes
1928	56					*5°A		Closes
1928	70A					*5°A		Closes
1928	66A					*5°A		Closes
1929	70B					*5°A		Closes
1929	66B					*5°A		Closes
1930	70B					*5°A		Closes
1930	66B					T C		Closes
1930	Willys Six	004″		004″	006″	*7°B	Opens	.

A —After top dead center T C —Top dead center
*Flywheel marks are provided for sleeve or poppet valve timing Indicator is at clutch inspection hand hole in flywheel housing on all models except 66 and 66A with peekhole in left motor leg.

TIMING CHAIN ADJUSTMENT

Willys-Knight Four Cylinders.—To adjust the chain, first spot the position of the coupling at the front of the generator. This should be done to insure replacing of the internal gear which remains on the generator shaft in its original position in the external gear of the coupling. Loosen the clamp screw at the center of the generator which holds the generator in position and remove the generator. Loosen the cap screws which secure the eccentric adjustment to the timing case. (Do not remove these cap screws). Turn the eccentric to the left until the chain is tight, then loosen until there is ¼" backlash in the external gear of the coupling. Replace the generator, making sure that the marks on the two gears of the coupling are in line. Secure the generator in position by tightening the clamp.

Willys-Knight Six Cylinder Models.—Chain sag on all Willys-Knight six cylinder models is controlled by an automatic take-up and does not need adjusting.

GAS LINE SCREENS

All models of Willys-Knight from 1925 to 1930 inclusive are equipped with vacuum tank fuel feed and have three strainer screens in the gas line from the supply tank to the carburetor. One strainer screen is located in the gascolator, one in the head of the vacuum tank, Fig. 1, and one at the carburetor. These gas line screens should be removed periodically, washed in clean gasoline and blown clear with air.

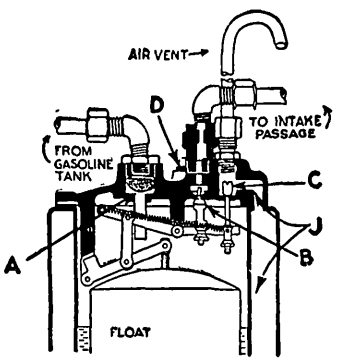


Fig. 1

Upper half of vacuum tank showing position of gas line screens. To remove, disconnect the feed line from the gasoline tank and screw out the hexagon bushing.

Carburetor Specifications

FLOAT LEVEL

Tillotson Carburetors

Two points should be considered when checking float level on Tillotson carburetors. One is the height of the gasoline level in the carburetor bowl and the other is the full movement of the float. In service, conditions may be encountered where someone unfamiliar with the proper carburetor calibration procedure has attempted to make a float level adjustment by bending the float lever arm. This practice will generally result in shortening the travel of the float, thus shortening the travel of the float valve. If the travel of the float valve is shortened it causes the valve to fail to open wide enough to admit sufficient gasoline to supply the motor at high speeds, thus causing a condition of leanness as the result of a lack of fuel.

Tillotson 1" Carburetors.—The float level adjustment for all 1" Tillotson carburetors is the same. To determine the correct float level, remove the carburetor bowl cover.. The level of the gasoline in the float bowl should be exactly 13/16" below the machined top edge of the float chamber.

If it should be necessary to readjust the float level, do not bend the float lever arm, but move the ferrule on the needle. This can be done by placing the needle in the vise in such a manner that the vise does not clamp the needle; then tap the needle gently with a light hammer. Care should be exercised not to get the ferrule too high or too low on the needle. To test the float level, clamp the carburetor in a level position in the vise and fill the float bowl with gasoline from a supply tank which is connected to the float bowl inlet by means of a rubber hose or copper pipe. The fuel level should be checked before replacing the carburetor on the car.

Tillotson 1¼" Carburetors.—The float level adjustment for all 1¼" Tillotson carburetors is the same. The level of the gasoline in the carburetor bowl should be 15/16" below the machined top edge of the float chamber.

If it should be necessary to change the float level, do not bend the float lever arm, but move the ferrule on the needle. This can be done by placing the needle in a vise in such a way that the vise does not clamp the needle. Then tap the needle gently with a light hammer. Care should be exercised not to get the ferrule too high or too low on the needle. The float level should be checked before replacing the carburetor on the car. This can be done by clamping the carburetor in the vise in a level position and filling the float bowl with gasoline from a supply tank by means of a rubber hose or copper pipe attached to the carburetor gasoline inlet.

CARBURETOR SPECIFICATION DIAGNOSIS

In service, mechanics who do not understand the correct carburetor calibration procedure attempt to improve carburetor performance by drilling out the nozzle openings. This should never be done under any consideration. The adjustment needle is for the purpose of varying gasoline mixture and takes care of the carburetor through its complete range of adjustment.

TILLOTSON CARBURETORS

The jet specification information for all models of Willys-Knight equipped with Tillotson carburetors is arranged by carburetor model rather than by car model. To find the carburetor specifications for any particular model, first determine the model of carburetor by either referring to table of Motor Specifications under Carburetor Adjustment or by

examining the name plate of the carburetor. All models of Tillotson carburetors are stamped with the model of the carburetor on the body. After the model of the carburetor is known, then the carburetor specifications can be found in the following specification tables under the particular model of carburetor in question.

Tillotson SE-2B

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Upper 31/32"	.....	.....
Venturi Lower 5/16"	.....	.....
Main Nozzle (Upper Holes)	2	No. 60
Main Nozzle (Lower Holes)	2	No. 52
Main Nozzle (Angle Hole)	1	No. 54
By-Pass Upper Supply Hole (in body casting)	.....	No. 70
By-Pass Lower Supply Hole (in body casting)	.....	No. 55
By-Pass Air Adjusting Hole	.....	No. 42
By-Pass Air Bleed Hole	.....	No. 58
By-Pass Fuel Restriction Hole	.....	No. 74
Fuel Adjusting Hole	.....	No. 55
Inner Well Air Bleed Hole	.....	No. 36
Outer Well Air Bleed Hole	.....	5/32"

Tillotson MS-2B

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Single 7/8"	.....	.....
Nozzle Fuel Restriction	.....	No. 46
Air Bleed Hole	.....	No. 50
Economizer Bleed Hole	.....	5/32"
Fuel Supply Hole	.....	No. 50
By-Pass Tube	1	No. 74
By-Pass Idle Hole (toward flange)	.....	No. 70
By-Pass Hole No. 2	.....	No. 57

Tillotson SP-8A

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Upper 15/16"	.....	.....
Venturi Lower 5/16"	.....	.....
Main Nozzle (Upper Holes)	1	No. 65
Main Nozzle (Lower Holes)	2	No. 62
Main Nozzle (Angle Hole)	.....	No. 56
By-Pass Upper Supply Hole (in body casting)	.....	No. 70
By-Pass Lower Supply Hole (in body casting)	.....	No. 58
By-Pass Air Adjusting Hole	.....	No. 42
By-Pass Air Bleed Hole	.....	No. 60
By-Pass Fuel Restriction Hole	.....	No. 74
Fuel Adjusting Hole	.....	No. 56
Inner Well Air Bleed Hole	.....	No. 36
Outer Well Air Bleed Hole	.....	No. 34

Tillotson SP-22A

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Upper 15/16"	.....	.....
Venturi Lower 5/16"	.....	.....
Main Nozzle (Upper Holes)	2	No. 60
Main Nozzle (Middle Hole)	1	No. 65
Main Nozzle (Lower Holes)	2	No. 65
Idle Fuel Supply (Angle Hole)	.....	No. 65
Fuel Adjusting Hole	.....	No. 56
By-Pass Upper Supply Hole (in body casting)	.....	No. 70
By-Pass Lower Supply Hole (in body casting)	.....	No. 56
By-Pass Air Adjusting Hole	.....	No. 42
By-Pass Fuel Restriction	.....	No. 74
By-Pass Air Bleed Hole	.....	No. 65
Inner Well Air Bleed Hole	.....	No. 36
Outer Well Air Bleed Hole	.....	No. 52

Tillotson SP-2B

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Upper 15/16"	.....	.....
Venturi Lower 5/16"	.....	.....
Main Nozzle (Upper Holes)	.....	No. 65
Main Nozzle (Lower Holes)	.....	No. 65
Main Nozzle (Angle Hole)	.....	No. 56
By-Pass Upper Supply Hole (in body casting	.....	No. 70
By-Pass Lower Supply Hole (in body casting)	.....	No. 55
By-Pass Air Adjusting Hole	.....	No. 42
By-Pass Air Bleed Hole	.....	No. 60
By-Pass Fuel Restriction Hole	.....	No. 74
Nozzle Fuel Adjusting Hole	.....	No. 60
Inner Well Air Bleed Hole	.....	No. 36
Outer Well Air Bleed Hole	.....	No. 52

Tillotson V-5A, V-5B

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Large 1 5/32"	.....	.....
Venturi Small 7/16"	.....	.....
Main Nozzle (Upper Holes)	1	No. 60
Main Nozzle (Middle Hole)	1	No. 65
Main Nozzle (Lower Hole)	1	No. 53
By-Pass Upper Supply Hole (in body casting)	1	No. 70
By-Pass Lower Supply Hole (in body casting)	1	No. 56
By-Pass Air Adjusting Hole	.....	3/32"
By-Pass Air Bleed Hole	.....	No. 65
By-Pass Fuel Restriction Hole	.....	No. 70
Fuel Adjusting Hole	.....	No. 52
Inner Well Air Bleed Hole	.....	No. 36
External Air Bleed Hole	.....	No. 40
Internal Air Bleed Hole	.....	No. 48
Pump Delivery Nozzle	.....	No. 58
Idle Fuel Supply	.....	No. 69

Tillotson W-2A

(Drill Specifications)

Description of Part	No. of holes	Drill size
Venturi Large 1 3/64"	.....	.....
Venturi Small 3/8"	.....	.....
Main Nozzle (Upper Holes)	2	No. 60
Main Nozzle (Middle Holes)	2	No. 60
Main Nozzle (Lower Holes)	2	No. 65
Fuel Adjusting Hole	.....	No. 52
Idle Fuel Supply	.....	No. 70
By-Pass Upper Supply Hole	1	No. 70
By-Pass Lower Supply Hole	1	No. 58
By-Pass Air Adjusting Hole	.....	3/32"
By-Pass Fuel Restriction Hole	.....	No. 70
External Air Bleed Hole	.....	No. 42
Internal Air Bleed Hole	.....	No. 50
Economizer Air Bleed Hole	.....	No. 54
Pump Delivery Nozzle	.....	No. 74

Carburetor Adjustment

ADJUSTMENT PRECAUTIONS

Sleeve Type Economizer.—It is important on all Tillotson type carburetors equipped with sleeve type economizer to see that the economizer is properly adjusted. Also, if the economizer valve is open at low speeds, the motor performance may be affected in that it will be difficult to obtain a smooth idle or low speed adjustment. As shown in Fig. 2, the economizer should be adjusted with a 1/64" to 1/32" overlap in the closed position

MOTOR SPECIFICATIONS

The following table lists the model and year of car, engine specifications, make, model and size of carburetor.

Car and Year	Model	Engine	No. Cyl.	Bore and Stroke	Carb. Model and Size
WILLYS-K	NIGHT				TILLOTSON
1925	67	Own	4	3 5/16"x4 1/2"	MS-2A, MS-2B 1 1/4"
1925	66	Own	6	3 1/4"x4 3/4"	R-2A, R-2B, R-2BF, SE-3A, SE-3AF, SE-3B and SE-3BF 1 1/4"
1926	70	Own	6	2 11/16"x4 3/8"	SE-2A 1 1/4"
1926	Great Six	Own	6	3 1/4"x4 3/4"	SE-3A 1 1/4"
1927	70	Own	6	3 1/4"x4 3/4"	SE-2B 1"
1927	66	Own	6	3 1/4"x4 3/4"	SE-3B, SE-3C, SP-4A 1 1/4"
1928	56	Own	6	3 1/16"x3 1/8"	SP-2B 1"
1928	70A	Own	6	2 11/16"x4 3/8"	SP-8A 1"
1928	66A	Own	6	3 5/8"x4 3/4"	SP-4A 1 1/4"
1929	70B	Own	6	2 11/16"x4 3/8"	SP-22A 1"
1929	66B	Own	6	3 5/8"x4 3/4"	V-5A, V-5B 1 1/4"
1930	Willys Six	Own	6	3 1/4"x3 1/8"	W-2A 1 1/8"
1930	70B	Own	6	2 11/16"x4 3/8"	SP-22A 1"
1930	66B	Own	6	3 5/8"x4 3/4"	V-5A, V-5B 1 1/4"

when the carburetor throttle valve is completely closed. This adjustment can be obtained by loosening the set screw (A) and moving the control arm on the end of the economizer shaft.

If difficulty is experienced in obtaining an adjustment or if car performance does not seem to be correct after a proper adjustment of the economizer has been made, check to see that the economizer sleeve is not worn excessively. Also, check to see that the throttle shaft is not badly worn. If the throttle shaft or economizer sleeve is worn to the point of where car performance is affected, replace with new parts.

Effect of Intake Manifold on Carburetor Adjustment.—The tendency for fuel to pile up on the walls and in the corners of the intake manifold makes it necessary when adjusting the carburetor to allow from 10 to 15 seconds time between each movement of the adjusting screw at the bottom of the carburetor. Take for example an adjustment from a rich to a lean mixture. If sufficient time is not allowed between each movement of the adjusting screw the motor may suddenly die during the adjustment operation, even though a gradual improvement in motor performance has been noticed.

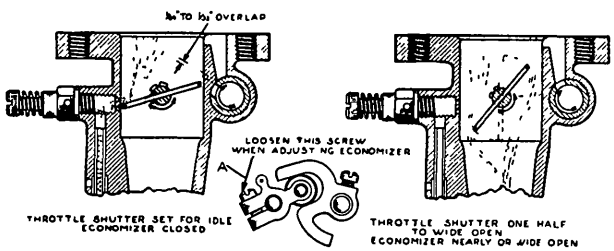

1/64" TO 1/32" OVERLAP
LOOSEN THIS SCREW WHEN ADJUSTING ECONOMIZER
THROTTLE SHUTTER SET FOR IDLE ECONOMIZER CLOSED
THROTTLE SHUTTER ONE HALF TO WIDE OPEN ECONOMIZER NEARLY OR WIDE OPEN

Fig. 2

Cross sectional view of upper half of carburetor throat, showing the location and adjustment of the sleeve type economizer used on Tillotson carburetors. The adjustment of the economizer is accomplished by means of the adjusting screw (A). It is important that the economizer be adjusted so that there is from 1/64" to 1/32" overlap when the throttle valve is closed, as shown in the left hand view.

Adjustment for Gasoline Mileage.—The best adjustment for gasoline economy is obtained by leaning the mixture down until the motor runs rough and then richening it up just to the point of where the motor runs smooth. This is especially true of the high speed adjustment and should be done with care for best results. When adjusting the carburetor from a lean to a richer condition, it will be found that due to the flexibility of adjustment, there is a wide range between the point where the motor smooths out from a lean mixture to a point of where the adjustment is too rich. Richening of the mixture beyond the point of smooth motor operation adds nothing to the performance of the car and lowers the gasoline mileage.

TILLOTSON MODEL MS

The Tillotson Models MS-2A and 2B carburetors were especially designed for the Willys-Knight Models 64 and 67. These are plain tube carburetors with an air bleed main nozzle, accelerating well and by-pass tube for idling.

The upper cross holes in the main nozzle constitutes an air bleed above the level of gasoline that thins out the mixture at ordinary speeds to give maximum economy. The lower cross holes fill the accelerating well and empties it when the throttle is opened quickly. There are but two adjustments on this carburetor; one is the high speed needle adjustment and the other is the idling adjustment. The high speed needle valve regulates the flow of fuel in the main nozzle. The approximate setting is about two turns open. To adjust, open the throttle one-third on the quadrant, retard the spark and when the motor is warmed up, adjust the needle valve until the engine runs smoothly. Then cut the mixture down one-eighth to one-fourth turn, which should give the best performance. The idle or by-pass adjustment regulates the air for the idling mixture and the approximate setting is one turn open.

This model has an additional feature which helps to secure economical operation and consists of a valve operated by a cam which cuts off a part of the air bleed at speeds above 35 miles per hour. This action gives a richer and more powerful mixture at high speeds and wide open throttle and a very lean mixture at ordinary running speeds. To set the economizer needle, run the car at 35 miles per hour. Mark the position of the throttle lever on the steering gear quadrant, stop the car and set the cam on the throttle shaft so that the plunger just closes the holes when the throttle lever is on the mark.

High Speed Adjustment. — The needle valve regulates the flow of fuel to the main nozzle and the approximate setting is two turns open. To adjust, open the throttle one-third on the quadrant, retard the spark and adjust the needle valve until the engine runs evenly. Then cut down 1/8 to 1/4 turn, which should give the best performance.

Idling Adjustment.—The by-pass needle or idle adjustment regulates the air for the idling and the approximate setting is one turn open. The position

of the butterfly to give the required speed is determined by the throttle stop screw, which should be adjusted at the same time as the idle adjustment. After the idling adjustment is completed, readjust the throttle valve stop screw until the desired speed is secured.

Economizer.—This model has an additional feature which helps to secure economical operation and consists of a valve, Fig. 2, operated by a cam which cuts off a part of the air bleed at speeds above 35 miles per hour. This gives a richer and more powerful mixture at high speeds and wide open throttle and a very lean mixture at ordinary running speeds. To set, run the car at 35 miles per hour; mark the position of the throttle lever on the steering gear quadrant; stop the car and set the cam on the throttle shaft so that the plunger just closes the holes when the throttle lever is on the mark.

TILLOTSON MODEL R

The adjustment information for Tillotson Models R-2A, R-2B, R-2BF is the same. These carburetors are of the non-air valve type having two adjustments, namely, the by-pass adjustment for idle and low speeds and the needle adjusting screw for medium and high speeds. (See Fig. 3). The idle nozzle gets its fuel from the main nozzle, therefore, the main nozzle should be adjusted first.

High Speed Adjustment.—Close the by-pass or idle adjusting screw (B), Fig. 3, to its seat, then open to the left or out one turn. Start the motor and set the throttle on the steering column about 1/3 open or to a position where the motor will be running at approximately 30 miles per hour car speed and keep the throttle in this position until the adjustment is completed.

After the motor is thoroughly warmed up, retard the spark lever fully and with the motor running at the same speed, turn the high speed adjustment (A) slowly to the right or up until the engine slows down from a lean mixture. At this point, turn very slowly in the reverse direction (usually from ¼ to ⅜ of a turn) to that point where the motor runs at maximum speed. Do not open the high speed adjustment beyond the point of where the motor smooths out and runs at maximum speed, since the most economical motor performance will be obtained with the needle valve in this position.

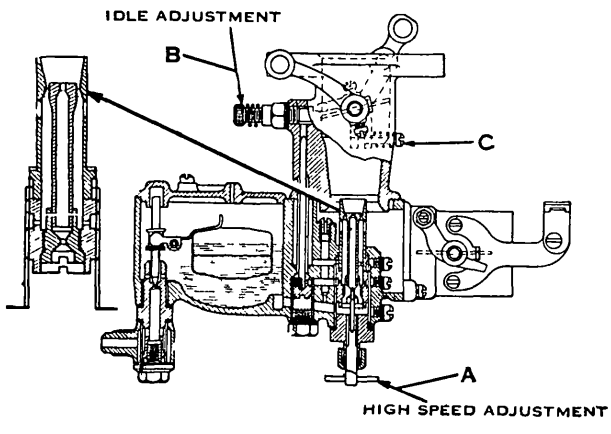


Fig. 3

Cross sectional view of Tillotson Model R carburetors used on Willys-Knight automobiles, showing an enlarged section of the main discharge nozzle assembly.

Low Speed Adjustment.—Close the throttle and adjust the throttle stop screw until the motor idles at the desired speed. Turn the adjusting thumb screw (B), Fig. 3, to the left or counter-clockwise, admitting more air and making the mixture leaner. Continue to turn until the motor sputters or misses. At this point turn slowly in the reverse direction to that position where the engine again fires evenly. After the idling mixture is correct, which should be approximately one full turn from a fully seated position, adjust the throttle stop screw to the proper idling speed of the motor.

TILLOTSON MODEL SE

The adjustment information for Tillotson Models SE-3A, SE-3AF, SE-3B, SE-3BF and SE-3C is the same. These carburetors have two adjustments—the by-pass adjustment for idle and low speeds and the needle adjusting screw for medium and high speeds. The idle adjusting screw operates on air while the high speed adjusting screw controls the gasoline that passes into the main nozzle.

High Speed Adjustment.—Set the throttle valve so that the motor runs at approximately 25 to 30 miles road speed. Turn the high speed adjusting needle in to the left until the motor slows down from a lean mixture. Then turn to the right or out until the motor just smooths out. The approximate setting is 2 to 2¼ turns open. Before attempting a carburetor adjustment, the spark plugs, ignition system and valves should be in good order and the gasoline line and strainers should be free from dirt.

Low Speed Adjustment.—The knurled screw on the side of the carburetor throat controls the motor performance at idling speeds. Turning this screw clockwise makes the mixture richer and turning it counter-clockwise makes the mixture leaner. Screw the idle adjustment counter-clockwise until the motor hesitates or misses from a lean mixture. Then turn clockwise until the motor just smooths out and idles properly. The approximate setting is one-half to one turn open. After the idling adjustment has been completed, set the throttle valve to the desired idling speed by means of the throttle stop screw.

TILLOTSON MODEL SP

The adjustment information for Tillotson SP-4A, SP-8A, SP-22A and SP-2B is the same. These carburetors are of the non-air valve type having two adjustments; namely, the idle or by-pass adjustment and the needle adjusting screw

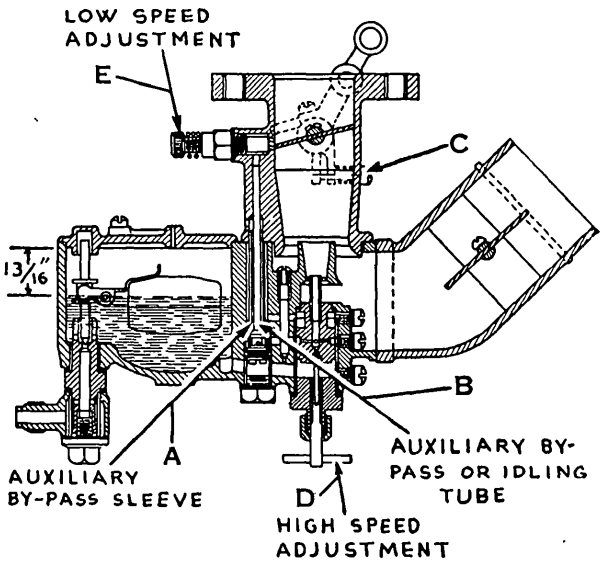


Fig. 4

Cross sectional view of Tillotson Model SP carburetors used on Willys-Knight automobiles. The auxiliary by-pass tube (A) must not be cracked or leaky.

for medium and high speeds. The idle nozzle gets its fuel from the main nozzle, therefore, the main nozzle should be adjusted first.

High Speed Adjustment.—Close the main adjusting needle (D), Fig. 4, by turning to the right or up until the needle is seated. (Never force tightly against its seat). Then open by turning to the left or down two complete turns. Close the by-pass or idle adjustment (E) until it is seated by turning to the right or in. Then open by turning to the left or out one-half turn. Thus adjusted, the engine should start and operate.

With the throttle partly open to an engine speed of approximately 25 miles per hour, allow the motor to warm up to normal driving temperature. After the motor has warmed up, retard the spark control lever fully and gradually turn the main adjusting needle to the right or up to a point where the engine slows down for want of fuel. When this point is reached, stop and gradually turn in the reverse direction until that position is found where the engine runs smoothly. This adjustment should be carefully made for gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and run smoothly. Provision for maximum power is automatically supplied so that care should be exercised in adjusting the main adjusting needle (D) to provide for economical road performance. After the high speed adjustment is completed, next adjust the idling screw (E).

Idle Adjustment.—Turning the idling adjusting screw (E), Fig. 4, to the right gives a richer mixture; turning it to the left gives a leaner mixture. This adjustment is sensitive and should be made with care.

Close the throttle and with the spark still retarded, set the throttle lever stop screw to run the engine at slightly faster speed than is desired for normal idling conditions. Turn the low speed adjusting needle (E) gradually to the left or out until a noticeable flutter or missing occurs. At this point, turn the screw in the reverse direction to that position where the engine again fires evenly. Leave the adjustment at this position, that is, delivering just as thin a mixture as will properly idle the engine. Next carefully adjust the throttle lever stop screw to operate the motor at the desired idling speed.

Accelerating Pump.—Sudden enrichment of the mixture is necessary for quick engine acceleration and additional power for maximum speed. The carburetor is equipped with an accelerating pump for this purpose. When the throttle is suddenly opened, the piston of the accelerating pump is raised, lifting fuel into the upper chamber. (See Fig. 5). This small amount of fuel flows through the metering nozzle leading directly into the venturi tube at the point where the rush of air is at its height, and the mixture is instantly enriched to the proportion for maximum power.

While driving at normal speed with the throttle partly open, the mixture is regulated for maximum economy; when the throttle is opened wide, the carburetor delivers the proper mixture for maximum power.

Dash Control or Auxiliary Lift Needle.—In starting a cold engine, the carburetor dash control should be pulled out all the way and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine, thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control, since this is likely to cause crankcase dilution. Do not use dash control to start when the engine is warm. To adjust the dash control to the carburetor, see that the choke lever is as far back as it will go with the control fully seated.

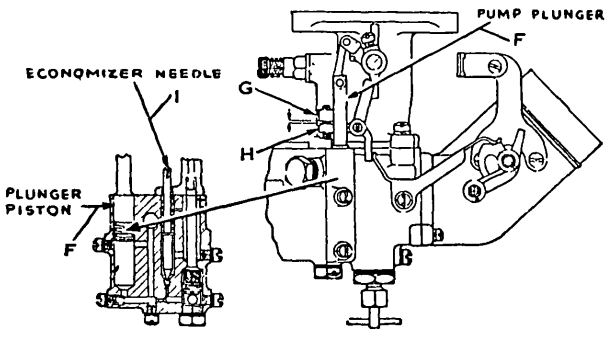


Fig. 5

Sectional view with insert of Tillotson Model SP type of carburetor used on Willys-Knight automobiles, showing the accelerating pump (F) and economizer needle (I). The normal lift of the economizer needle is 1/16". This device enriches the mixture for starting and operating a cold engine. It also provides a richer mixture for power purposes. (See adjustment instructions under Dash Control.)

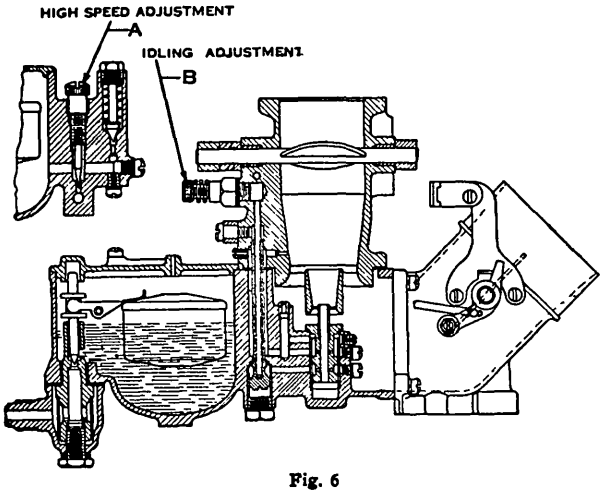


Fig. 6

Cross sectional view of Tillotson Model V carburetors used on Willys-Knight automobiles, showing a cross section view of the high speed adjustment (A). Model V carburetors are different from the SP type in that the high speed adjustment is mounted behind the bowl, as shown, while on the SP type the high speed adjustment is located at the bottom of the carburetor.

If it should be necessary to reset the lift or metering pin, proceed as follows: With the throttle closed, and the choke fully open, there should be a minimum of .030″ to .040″ play between the adjustable nut (G), Fig. 5, and the fork (H) on the cross lever. There should always be sufficient play between the lever coupling, the choke cam and the needle lift lever to insure a seating of the needle. As shown in Fig. 5 the metering or economizer needle (I) also provides a rich mixture for power purposes and high speeds with the throttle open. Thus it is important that the economizer needle adjustment be accurately made as described above.

TILLOTSON MODEL V

The adjustment information for Tillotson Models V-5A and V-5B is the same. These carburetors are of the plain tube, expanding type having fixed air passages while the fuel is automatically controlled in proportion.

High Speed Adjustment.—Close the high speed adjusting needle (A), Fig. 6, by turning to the right or down until the needle is seated. (Never force tightly against its seat). Then open by turning to the left or up three complete turns. Next close the by-pass or idle adjustment (B) until it is seated by turning to the right or in. Then open by turning to the left or out three-quarters to one full turn. Thus adjusted, the engine should start and operate.

Retard the spark control lever and with the engine running approximately 25 miles per hour, road speed, gradually turn the main adjusting needle (A), Fig. 6, to the right or up to a point where the engine slows down from a lean mixture. When this point is reached, stop and gradually turn in the reverse direction until that position is found where the engine runs smoothly. This adjustment should be carefully made for gasoline economy cannot be obtained if the needle is allowed to pass over the point of sufficient fuel delivery to give good power and smooth running. Provision for maximum power is automatically supplied through the accelerating pump and needle lift, so that in adjusting, set the main adjustment to provide for economical road performance.

Idle Adjustment.—Close the throttle and with the spark control lever retarded, set the throttle lever stop screw to run the motor faster than is desired for normal idling speed. Next turn the idle adjustment (B), Fig. 6, gradually to the left or out, leaning the mixture until a noticeable flutter or missing occurs. At this point, turn the screw in the reverse direction only to that position where the engine again runs smoothly. Leave the adjustment at this position, delivering just as lean a mixture as will properly idle the engine and carefully adjust the throttle stop screw to operate the engine at the desired idling speed.

In operation, the carburetor is fully automatic except that at partial choke positions when the manual choke control on the dash is pulled out. Fuel metering is governed by the usual high and low adjustment needles.

Lift or Metering Needle Setting.—The metering or economizer needle is affected by the dash control when starting and by the throttle lever at high speed. In starting a cold engine, the carburetor dash control should be pulled out all the way and as soon as the engine starts, the control should be moved slightly inward. This automatically supplies a rich mixture to the engine, thus enabling it to start easily. The dash control should be pushed in all the way just as soon as the engine is warmed sufficiently to run without spitting back into the carburetor. Avoid excessive use of the dash control since this is likely to cause crankcase dilution. Do not use the dash control to start when the engine is warm. If it should become necessary to adjust the dash control to the carburetor, see that the choke lever is as far back as it will go with the control fully seated.

If it should be necessary to reset the lift or metering needle, proceed as follows: With the throttle closed and the choke fully opened, there should be a minimum of .030″ to .040″ play between the adjustable nut (C), Fig. 7, on the needle and the fork (D) on the cross lever. There should

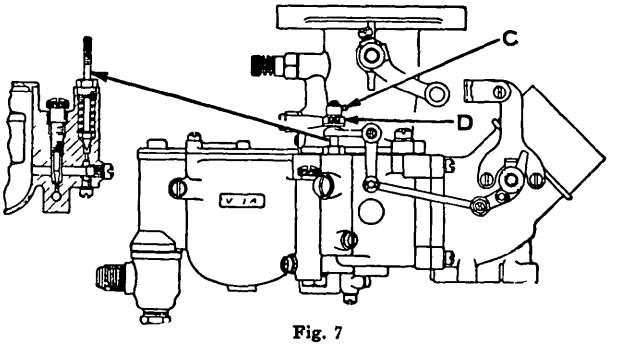


Fig. 7

View of Tillotson Model V carburetors used on Willys-Knight automobiles showing a sectional view of the high speed adjustment and auxiliary starting needle. The lift of the auxiliary needle can be regulated by the nut (D).

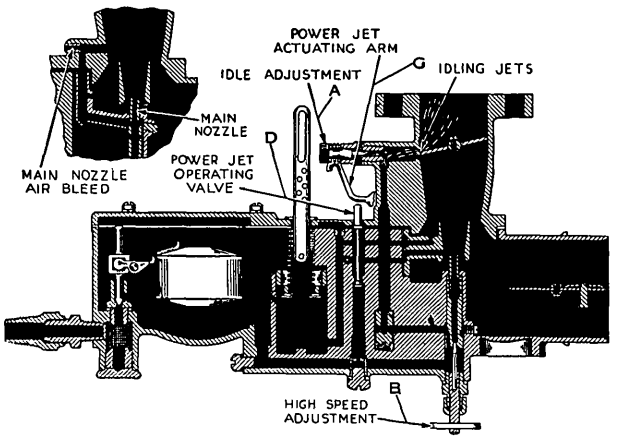


Fig. 8

Cross sectional view of Tillotson Model W carburetor, showing the accelerating pump, the power valve, the high and low speed adjustments and the idling system. In the insert to the left is shown the main discharge nozzle design and the location of the main nozzle air bleed.

always be sufficient play between the levers coupling the choke cam and the needle cam lift lever to insure the seating of this needle.

TILLOTSON MODEL W

These carburetors are very similar to the SP models with the exception of the main nozzle design, accelerating pump and power jets.

High Speed Adjustment.—Before starting the motor, close the main or high speed adjustment (B), Fig. 8, by turning to the right or up until it just seats. (Do not force the needle tightly against its seat). Then open to the left or down 2½ complete turns. Next close the idle adjusting screw until the needle just seats by turning to the right, or in then open ¾ of a full turn to the left or out. The idle adjusting screw is shown at (A), Fig. 8. With the carburetor thus adjusted, start the engine and run until thoroughly warm. Retard the spark fully and open the throttle to a point where the engine is running fast enough to drive the car approximately 25 miles per hour on a level road.

With the engine running at this speed, gradually turn the main or high speed adjusting needle (B) to the right or up until the motor slows down from a lean mixture. When this point is reached, stop and turn in the reverse direction to that position where the motor runs smoothly. (Usually ⅛ to ¼ of a turn is sufficient). This adjustment should be carefully made since economy cannot be obtained if the adjusting needle passes beyond the point of sufficient fuel for good power and free running.

Idle Adjustment.—Close the throttle fully and with the spark still retarded, set the throttle stop screw so that the engine will idle slightly faster than is desired for normal idling speeds. Next turn the idle or low speed adjusting screw (A), Fig. 8, to the left or out, leaning the mixture until a noticeable flutter or missing occurs. At this point, turn the screw in the reverse direction or in to a point where the engine fires evenly. After the adjustment operation is complete, again reset the throttle lever stop screw so that the engine idles at the desired speed. The motor should now be throttled to approximately 25 miles per hour for a few seconds. This procedure will clear the manifold of any fuel which has gathered on the sides and in the corners, thus making an accurate recheck of the idling adjustment possible.

Main Nozzle Design.—As shown in the insert, Fig. 8, the main nozzle is designed to operate independent of the lift needle or power jet, which comes into action at full open throttle as shown in Fig. 9. The main nozzle air bleed is also shown in the insert, Fig. 8.

Power Jet.—The power jet in the Model W is operated through a valve which in turn functions at all positions of the choke except when the choke is fully opened. (See the right hand view in Fig. 9). The power jet is also operated by a lever which is attached to the throttle and functions at full open throttle position. The object of the power jet is to provide additional fuel for cold engine operation and for maximum power requirements. As shown in Fig. 9, fuel from the power jet when the jet is opened, is fed into the venturi at a point approximately level with the top of the main discharge jet. At full open throttle position, the power jet supplies additional fuel to the venturi which is mixed with the fuel fed in from the main discharge jet.

The clearance between the power jet actuating arm (C), Fig. 8, and the power jet operating valve (D) with the throttle valve fully closed and the choke fully opened, should be 1/16". If the power jet actuating arm (C) rides the power jet operating valve, low gasoline mileage may be the result.

Accelerating Pump.—The accelerating pump used on Tillotson W carburetors is of the plunger type as shown in Figs. 8 and 9. As shown in Fig. 9, when the throttle is suddenly opened, the pump plunger is depressed forcing a stream of fuel into the main venturi through a nozzle which is located beside the small venturi.

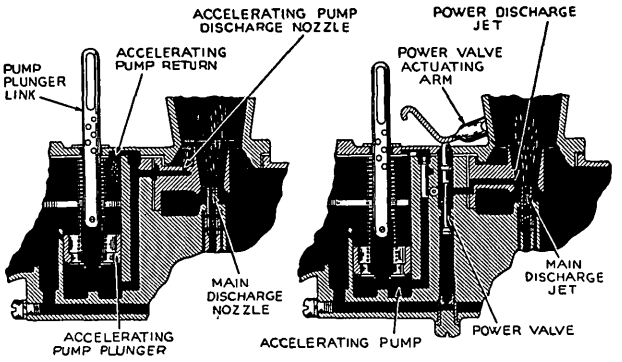


Fig. 9

Two views of different sections of Tillotson Model W carburetor, showing the accelerating pump and discharge nozzle and the power valve and its discharge nozzle. Note that when the throttle is fully opened or when the choke valve is fully closed, the power valve actuating arm forces the power valve open and feeds an extra amount of fuel to the motor through the power discharge jet in the side of the small venturi.

Schebler Carburetors

Schebler Model S

Action at Low Speeds.—The Model S is an air valve carburetor having two air inlets. The fixed air opening is through the venturi (W) Fig. 1 and is very small, furnishing barely enough air to enable an engine to idle slowly. Due to the small opening through the venturi, the velocity of the air passing through it is very high, even when the engine is idling. This enables it to pick up gasoline at the nozzle (O) and atomize it thoroughly. Due to the venturi, the suction on the gasoline at the nozzle is quite strong, making it possible to control the mixture very accurately and to get positive and reliable action at low speeds.

Capacity at High Speeds.—The auxiliary air valve (C) Fig. 1 is closed for idling and wide open for full power. It is very large, making it possible to handle tremendous amounts of air at the smallest suction. This ability to handle either very large or very small air flows is what is referred to in the term "long range carburetor."

Gasoline Passageway.—The gasoline enters the float chamber through the valve (R) Fig. 1 and the level is governed by the float (J). After leaving the float chamber, the gasoline is governed by the gasoline needle (M) at the point (L). It then passes through the cross drill (N) into the nozzle (O) and on into the air stream through the venturi (W).

How the Mixture Ratio is Maintained.—The method of maintaining the correct fuel-to-air ratio is as follows: The motion of the air valve is transmitted to the needle valve lift lever (B) Fig. 1 which rotates about the fulcrum point (A), giving to the gasoline needle (M) a definite part of the air valve motion. Thus, the flow of gasoline will tend to vary in direct proportion to the air, no matter how much or how little air is being used.

The Model S carburetor is designed to give maximum power and maximum economy at the same adjustment. This may seem impossible at first but it is accomplished as follows: A very lean mixture is required to give the most miles per gallon while considerably more gasoline is needed for full power. When driving at medium speed or on a smooth road, comparatively little power is needed and economy and smooth performance are the important requirements. Under these conditions, the throttle will be only part way open and the fulcrum point (A) will be in the position corresponding to maximum economy. When full power is desired the throttle is opened wide. This will cause the cam, Fig. 5, to depress the cam tappet screw (D), thus moving the fulcrum point (A) Fig. 1 over toward the air valve, and lifting the gasoline needle (M). This will make the mixture a certain per cent richer just enough to change over from full economy to full power. These adjustments can be independently made on any engine so that they can both be exactly right. The carburetor can therefore be adjusted so as to give maximum economy under ordinary driving conditions and still deliver full power and maximum acceleration when desired.

(T) Fig. 1 is placed at the required height so that any excess gasoline pumped into (S) will run back into the float chamber and will not be wasted. While necessarily large, the pump is therefore not wasteful.

The amount of gasoline required for acceleration varies with the size, shape and temperature of the intake manifold. The Model S pump can be adjusted to any manifold. The rate of delivering the extra gasoline can be changed according to the size of the metering hole (V) Fig. 1 and the total amount delivered according to the height of the overflow (T). The amount of extra gasoline used in acceleration is quite small but it makes the difference between positive action on the one hand and an uncertain and delayed response to the throttle on the other.

The Dash Pot.—The gasoline dash pot (I) Fig. 1 is used to prevent the fluttering of the air valve (C) when the engine is pulling hard at a low speed. Under these conditions, the fluctuations of pressure are slow but are of small magnitude so that the spring (E) is strong enough to hold the valve (F) firmly in place and prevent any fluttering. Suppose, however, that the car is driven at a high speed, the throttle closed for a moment and then suddenly opened again; an immediate response will be desired from the engine. Under these conditions, a heavy vacuum will be established in the manifold during the coasting which will be transferred to the air valve when the throttle is open. Under this heavy force, the spring (E) will collapse and the air valve will drop as though the dash pot were not there; allowing the engine to respond with a full thrust from the very first. The little valve (G) is provided to allow the air valve to close rapidly.

Dash Control for Starting.—The Model S has no choke. It delivers to the engine whatever air is needed and meters the required fuel into that air. When a very rich mixture is needed as in starting a cold engine, the dash control lever (F) Fig. 5 is pulled down by means of the wire (E). This will rotate the fulcrum lever (X) Fig. 1 about the shaft (Z) toward the air valve (C) and give the gasoline needle an initial lift from an increased percent of the motion of the air valve. The velocity of the air through the venturi (W) is ample to pick up and atomize whatever gasoline may pass through the nozzle (O), so that a mixture many times as great as normal may be effectively supplied to the manifold of the engine; and starting be made correspondingly easy. As the engine speeds up, the effect of the initial life of the needle will diminish so that the percent of excess gasoline will decrease but not disappear at high speeds. This corresponds to the requirements of an engine as a greater percent of excess gasoline is required to run a cold engine slowly than fast.

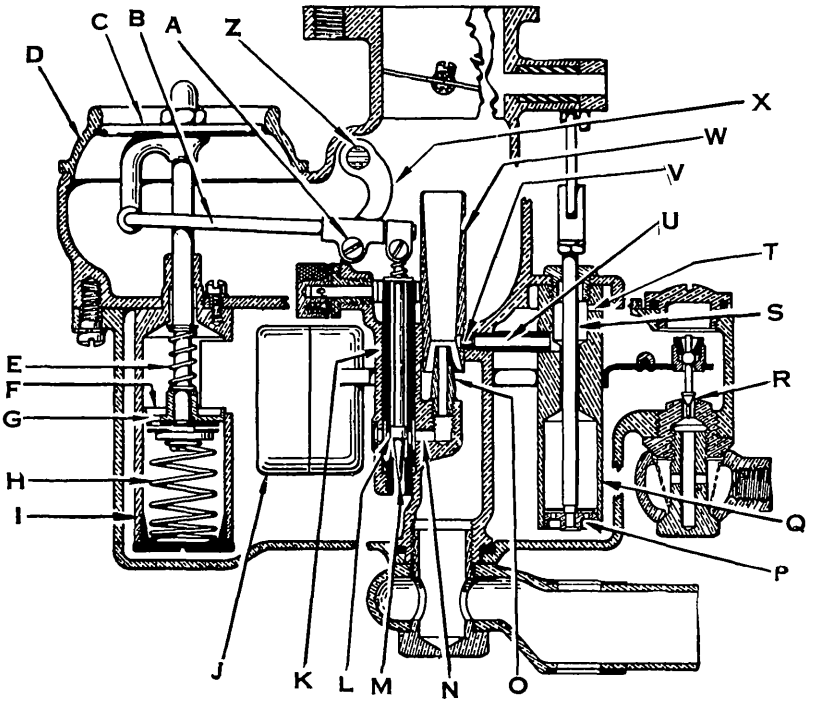


Fig. 1

Cross section view of Schebler Model S carburetor showing (A) lift lever fulcrum screw; (B) needle valve lift lever, (C) air valve, (D) air valve housing; (E) upper dash pot spring; (F) dash pot valve or piston; (H) lower dash pot spring, (I) dash pot housing; (J) float; (K) needle valve assembly; (O) main discharge nozzle; (P) accelerating pump piston, (Q) accelerating pump cylinder; (R) float valve assembly, (S) accelerating pump plunger or rod, (T) accelerating pump overflow passage; (U) accelerating pump cross passage, (V) accelerating pump cross passage discharge opening; (W) venturi; (X) lift lever fulcrum arm.

Accelerating Pump.—When the throttle is opened suddenly, a certain portion of the gasoline will lag behind the air. This will cause the mixture reaching the cylinders to be temporarily leaner than the accurately metered mixture leaving the carburetor. If the carburetor is adjusted lean for economy, this temporary impoverishment of the mixture would cause the engine to misfire were it not for the accelerating pump (Q) Fig. 1 which causes the mixture leaving the carburetor to be temporarily enrichened during acceleration.

When the throttle is opened, the piston (P) Fig. 1 of the accelerating pump is raised lifting gasoline into the upper chamber (S). From here, the gasoline flows through the passageway (U) to the venturi (W) where it mixes with the air entering the carburetor. No gasoline at all will pass through (U) except immediately following an opening of the throttle; so that the accelerating pump acts only during periods of acceleration.

The capacity of the pump is large compared to the amount of gasoline used for acceleration. This is for a definite reason. When the throttle is opened, just a few degrees from the idling position at low speed, the engine will be running under full load and a full load charge of accelerating gasoline will be needed. The accelerating pump must therefore be able to deliver the full load charge of gasoline with just a few degrees of motion. On the other hand, no greater charge than this is needed when the throttle is opened wide. For this reason, an overflow passage (V), Fig. 1, is provided near the top of the pump cylinder to permit the excess gasoline to return to the carburetor bowl.

DECELERATING DEVICE

The decelerating device, Fig. 2, increases the idling speed temporarily after the throttle has been returned to the idling position from a part or wide open throttle. In other words, if the car is driven along say at five miles per hour and the throttle is suddenly kicked open to 10 or 15 miles per hour or to any speed, then suddenly decelerated back to idle, the idling speed will be increased considerably for about 10 seconds when the decelerating device will close off allowing the motor to idle at the normal speed. This action gives a very positive idle under any condition.

The first carburetors with this decelerating device used the type shown on the print marked "first type," Fig. 2. After this first lot, the device was changed slightly and is as shown on the print showing the "second type."

Referring to the first type, the main points of the decelerating device are the cylinder or tube (6) and the plunger (5) Fig. 2. The tube fits in its bearing in the body and is held in place with a set screw (15). The upper end of the tube is bevelled so that by turning the tube the passage through hole (3) can be made large or small. The slot (18) is slightly below the gasoline level so that fuel can run into the tube. The slot (17) is at the body line and serves as an air opening so that no gasoline can be sucked up into the upper part of the tube. The cap (20) shuts off the lower end of the tube.

The upper end of the plunger (5) is cone shaped to fit in the shut off hole (2). The lower end is fitted with a ball valve which lets the piston drop rapidly but shuts off on the upward stroke and retards the rising of the plunger.

The action of the device is as follows: When the engine is idling normally, the plunger (5) is at the top of the cylinder and its cone shaped upper end closes off hole (2) thus closing off the idle by-pass through holes 1, 2 and 3. When the throttle is kicked open, the suction in holes 1 and 2 drop off, allowing the plunger to drop. When the throttle is again closed, the plunger does not rise instantly but travels slowly upward for a certain length of time before closing off. During this period, a by-passing occurs around the disc through holes 1, 2 and 3 and this by-passing speeds up the idle sufficiently to overcome any tendency to stall. When the plunger finally comes up and closes off the passageway, the manifold is sufficiently cleaned out so that the normal low idle will not die.

First Type Decelerating Device

These devices have all been timed at the factory to close off in about 8 to 14 seconds. To check this time, turn off the motor then start the motor with the throttle closed and time the length of the increased speed from the instant the motor starts firing until the idle drops down to normal. Time this a number of times with the second hand of your watch or with a stop watch.

The normal idling speed should be set with the idle stop screw only after the low idle has been resumed.

The returned speed of the decelerating device can vary four or five seconds without causing any trouble.

If the motor refuses to return to the low idle, there is probably dirt in the device and the device should be taken out and thoroughly washed in clean gasoline. After it is in the carburetor, there is little chance for dirt to get into it.

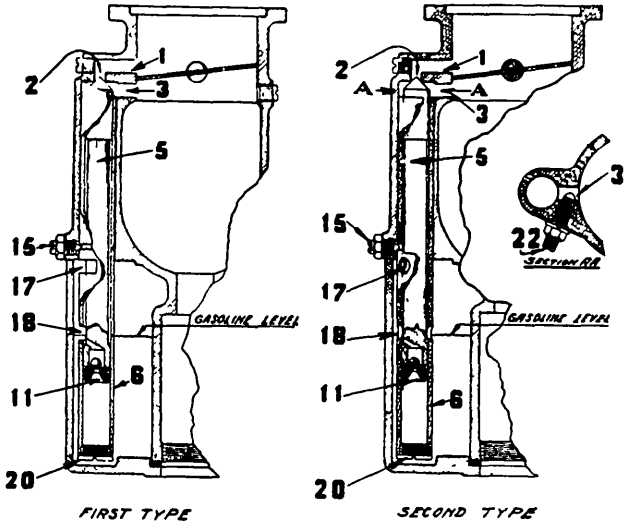


Fig. 2

Cross sectional view of the first and second types decelerating device used on Schebler S 1½" carburetors. If difficulty is experienced with the motor idling fast on these models, clean the decelerating device as explained in the paragraphs under the heading "First Type Decelerating Device."

To take out the decelerating device, remove the bowl and loosen up the screw (15) Fig. 2. Before doing this, mark the position of the tube in the body by scratching a line on both tube and body so that the tube will go back into the same position.

Remove the cap (20) and slip the plunger down as far as possible and then wash out the assembly with clean gasoline. The plunger in this first type cannot be taken all the way out.

Replace the cap (20) and tighten it down with a screwdriver; then replace the tube in the body in the same position as before and tighten set screw (16) just tight enough to hold the tube. Do not jam this screw; tighten the nut and lock washer and replace the bowl.

Try the decelerator for timing as explained above after you are sure that gasoline has filled the dash pot in the tube (6). The first few trials will be fast on account of air in the tube (6).

If the plunger cuts off the by-passing in less than 8 seconds, take off the bowl and turn the tube (6) counter-clockwise looking at the cap (20). If the plunger returns in more than 15 seconds, turn the tube (6) clockwise. For each trial, turn the tube about 1/16th of a complete revolution from the original position. Set the lock screw as explained above.

Second Type Decelerating Device

In this type, the tube (6) is held in one position in the carburetor body, see Fig. 2. Since the screw (15) registers with a hole in the tube, the tube is also cut off square at the top.

The timing of this device is accomplished by turning the screw (22) which shuts off or opens up hole (3), depending upon which way it is turned. To slow the return to normal idle, turn the screw (22) counter-clockwise and to speed up the return, turn it clockwise. The return to normal idle as explained above, should occur in about 8 to 14 seconds.

If any trouble is encountered, take out the tube and plunger by removing the bowl and loosening up screw (15). Take off cap (20) and the plunger can be removed.

Clean the parts in clean gasoline and wipe off plunger and wipe out tube with a clean rag before reassabling. Replace cap (20) and replace the tube in the body, being sure that the pointed end of screw (15) registers with the holes in the tube (6). Also be sure that the valve seat (11) is tight in the plunger. Replace the bowl.

Time the device as explained above to close to normal idle in about 8 to 14 seconds.

CARBURETOR ADJUSTMENT

Schebler S Brass Bowl

Idle Adjustment.—Turn the idle adjusting knurl Fig. 3 to the right for a lean mixture and to the left for a rich mixture. To check the idle adjustment, warm up the motor thoroughly and by this we mean to have the motor hot; then close the

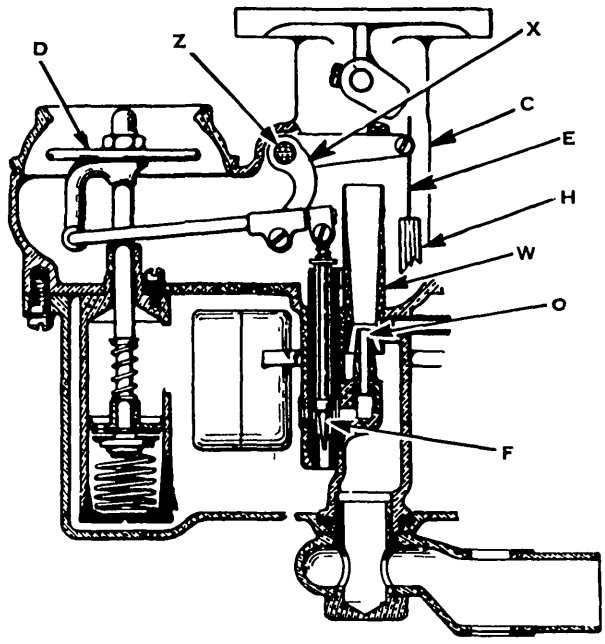


Fig. 3

Schebler Model S Brass Bowl type of carburetor showing location of adjustment screws. Float valve seat is not a removable part.

throttle, retard the spark all the way if the car has manual spark control, and then adjust idle stop screw so that the motor will not idle less than 5 miles per hour on the road. After the throttle has been adjusted so that the engine idles at the proper speed, then proceed to check the idle adjustment as follows: Turn the idle adjusting screw to the right (clockwise) turning slowly watching the motor fan at the same time and continue to turn in this direction which is the lean direction until the fan falters or in other words is not turning with a smooth constant motion. Just as soon as the fan falters, stop turning the idle adjustment to the right, lean, and from this point turn the idle adjustment back to the left or rich direction exactly six clicks for summer driving and eight to nine clicks for winter driving. Clicks can be felt while turning the idle adjusting knurl; this will give you an accurate setting on the idle adjustment providing you follow out all of the instructions as outlined above.

Range Adjustment.—This adjustment is only effective in the driving range at speeds from 20 to 40 miles per hour and does not affect acceleration or hill climbing with wide open throttle.

The adjustment is made by turning the range adjusting screw (B) Fig. 3 to the left for a lean mixture and to the right for a rich mixture in the driving range.

To obtain the factory setting, screw the range adjusting screw (B) in or out so the head is flush with the bushing. If the range adjustment is changed, it will be necessary to readjust the idle mixture.

Power Adjustment.—This adjustment as shipped from the factory, ordinarily need not be changed. This adjustment is not sensitive to one turn in either direction and is only effective for wide open throttle running. In changing this adjustment, try it on a hill after each change for best results. In extreme cases, it may be necessary to furnish a leaner or richer mixture for wide open throttle position. The adjusting cam tappet screw is turned to the left (counter-clockwise) to give a richer mixture and turned to the right (clockwise) to give a leaner mixture.

With throttle wide open, adjust the cam tappet screw until there is about 1/8" to 5/32" space between the dash control lever (P) Fig. 3 and the end of the range screw (B).

Schebler S Die Cast Bowl

Idle Adjustment.—Turn the idle adjusting knurl Fig. 4 to the right for a lean mixture and to the left for a rich mixture. To check the idle adjustment, warm up the motor thoroughly and by this we mean to have a hot motor. Then close the throttle, retard the spark all the way if the car has manual spark control and then adjust idle stop screw so that motor will not idle less than five miles per hour on the road. After you have the proper idle engine speed, then proceed to check the idle adjustment as follows: Turn the idle adjusting screw to the right (clockwise) turning slowly,

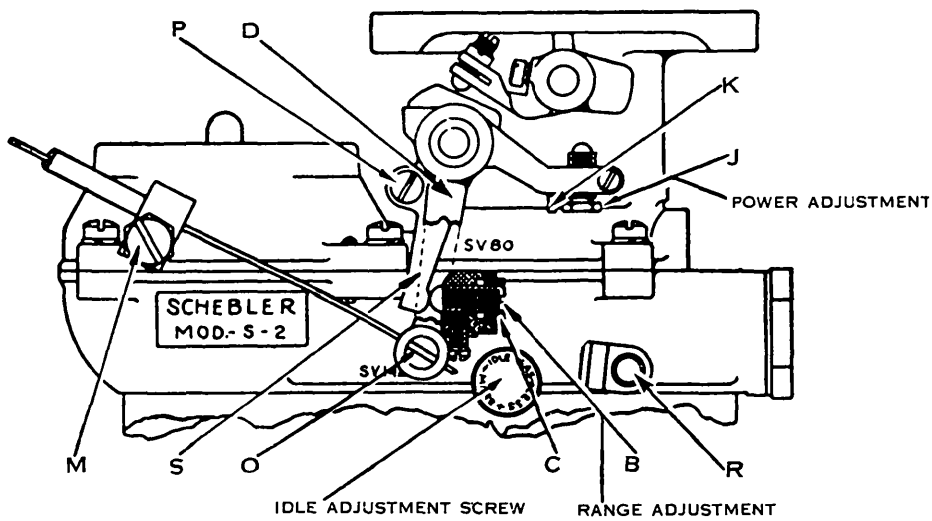


Fig. 4

Schebler Model S with Die Cast Bowl showing the three adjustments. On regular type carburetors (those having Brass Cast Bowls) the float valve seat is not a removable part but is machined in the main bowl casting. On Die Cast Bowl types the float valve and seat are furnished as a separate assembly.

watching the motor fan at the same time and continue to turn in this direction, which is the lean direction, until the fan falters or in other words, is not turning with a smooth, constant motion. Just as soon as the fan falters, stop turning the idle adjustment to the right (lean) and from this point turn the idle adjustment back to the left or rich direction exactly six clicks for summer driving and eight to nine clicks for winter driving. Clicks can be felt while turning the idle adjusting knurl. This will give you an accurate setting on the idle adjustment providing you follow out all of these instructions just as they have been outlined above.

Range Adjustment.—This adjustment is only effective in the driving range at speeds from 20 to 40 miles per hour and does not effect acceleration or hill climbing with wide open throttle.

The adjustment is made by turning the range adjusting screw (B) Fig. 4 to the left for a lean mixture and to the right for a rich mixture in the driving range.

This adjustment as shipped from the factory will usually be found to be best unless a lean or richened mixture is necessary at speeds from 20 to 40 miles per hour.

To obtain the factory setting, screw the range adjustment screw (B) in or out so the head is flush with the bushing (C). If the range adjustment is changed, it will be necessary to readjust the idling mixture.

Power Adjustment.—Extensive research indicates that the carburetor will give the best mixture for maximum power on the hills or at high speeds when the power screw (J) Fig. 4 is flush with the pin (K) in high altitudes, however, more power may be obtained by leaning up on the power mixture—turning (J) to the left (counter-clockwise) three to five turns.

Accelerating Pump Adjustment.—You will note a small lever on the accelerating pump which governs the amount of accelerating gas. This lever should be in the raised position for winter giving a larger amount of extra gas for acceleration. In the summer, this lever should be pushed down because in summer you do not need as much gas for quick acceleration.

Schebler S Stamped Bowl

Idle Adjustment.—Turn the idle adjusting knurl (A) Fig.5 to the right for a lean mixture and to the left for a rich mixture. To check the idle adjustment, warm up the motor thoroughly and by this we mean to have a hot motor. Then close the throttle, retard the spark all the way if car has manual spark control and then adjust idle stop screw so that motor will not idle less than five miles per hour on the road. After you have made the proper idle adjustment so that the motor runs at the correct speed, then proceed to check the idle adjustment as follows: Turn the idle adjusting screw (A) Fig. 5 to the right (clockwise) turning slowly, watching the motor fan at the same time and continue to turn in this direction which is the lean direction until the fan falters or in other words is not turning with a smooth constant motion. Just as soon as the fan falters, stop turning the idle adjustment (A) to the right (lean) and from this point turn the idle adjustment back to the left or rich direction exactly six clicks for summer driving and eight to nine clicks for winter driving. Clicks can be felt while turning the idle adjusting knurl (A). This will give you an accurate setting on the idle adjustment providing you follow out all of these instructions just as we have outlined them.

Range Adjustment.—See Range Adjustment for Schebler Model S Brass Bowl.

Power Adjustment.—See Power Adjustment for Schebler Model S Brass Bowl.

Schebler S Duplex

Idle Adjustment.—The Duplex carburetor has two idle adjustment (A) and (E) Fig. 6. Before making any carburetor adjustments, warm up the motor to average driving temperature. Both adjustments (A) and (E) turn in the same direction for rich and for lean. Turning these adjustments to the right (clockwise) makes the mixture leaner and to the left (counter-clockwise) makes the mixture richer.

The Duplex carburetor has two throttle openings into the manifold and the throttle opening and idle adjustment next to the motor always controls the four center cylinders numbers 3-4-5-6; the throttle opening and idle adjustment of the carburetor which is on the outside next to the hood of the car always governs the two front and two back cylinders numbers 1-2-7-8.

To adjust the inside idle adjustment next to the motor, disconnect spark plug wires numbers 1-2-7-8 and ground them some place on the motor head. This leaves the four center cylinders numbers 3-4-5-6 operating which are governed by inside idle adjustment. Run idling adjustment screw (A) in a little way in order to get a slightly faster idle

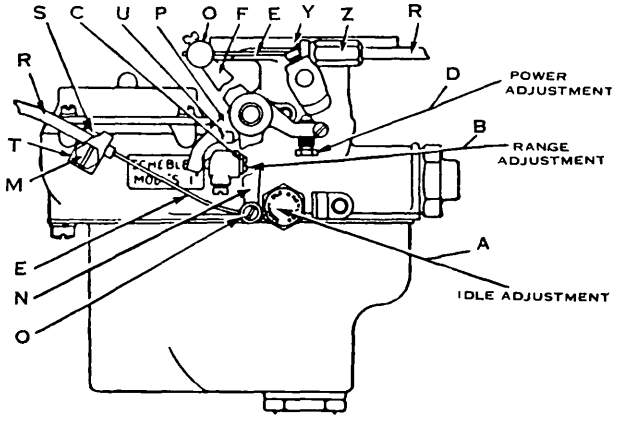


Fig. 5

Schebler Model S Stamped Bowl showing three adjustments. On regular type carburetors (those having Brass Cut Bowl) the float valve seat is not a removable part but is machined in the main bowl casting. On Stamped Bowl type float valve and seat are furnished as a separate assembly

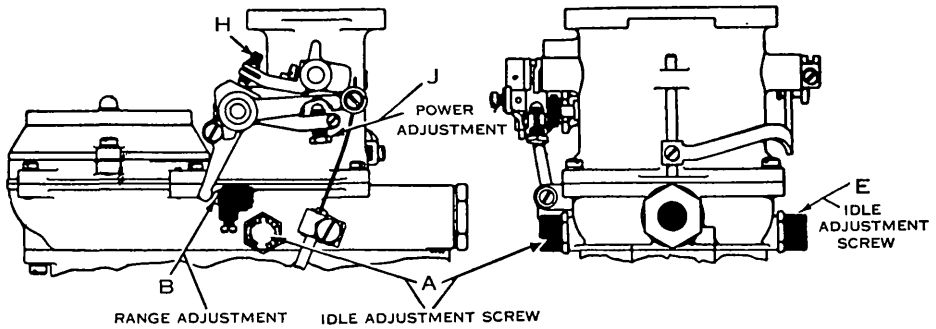


Fig. 6

Schebler Model S Duplex showing two idle and one power adjustment. The throttle opening and idle adjustment next to the motor controls cylinders numbers 3-4-5-6; the outside throttle opening and idle adjustment controls cylinders numbers 1-2-7-8.

speed which is necessary when checking four cylinders at a time. Retard the spark and depress the air valve of the carburetor 1/32" to 1/16". If the adjustment is lean on the four center cylinders numbers 3-4-5-6, the motor will die immediately. If adjustment is too rich, the motor will speed up. When adjustment is just right, you should be able to depress the air valve 1/32" to 1/16" and the motor should continue to turn over 2 or 3 revolutions and then start to quit.

To adjust the outside idle adjustment, put the spark plug wires back on numbers 1-2-7-8 plugs and remove wires from numbers 3-4-5-6 and ground them. You are then ready to check the outside idle adjustment by depressing the air valve the same as described above.

After checking the two idle adjustments individually, connect up all spark plug wires so all eight cylinders will fire and then make a double check by depressing the air valve of the carburetor the same as you did when checking four cylinders at a time. Before making your final check with all eight cylinders firing, check the engine idle speed setting the idle stop screw (H) so that the engine will idle 5 to 6 miles per hour on the road. In making the final check by depressing the air valve, if you find the job a little rich or lean with all eight cylinders hooked up, turn both idle adjustments in the same directions rich or lean to correct this, turning each one only one or two clicks at a time and then recheck by depressing the air valve of the carburetor.

Range Adjustment.—This adjustment is only effective in the driving range at speeds from 20 to 40 miles per hour and does not affect acceleration or hill climbing with wide open throttle.

The adjustment is made by turning the range adjusting screw (B) Fig. 6 to the left for a lean mixture and to the right for a rich mixture in the driving range.

This adjustment as shipped from the factory will usually be found to be best unless a lean or richened mixture is necessary at speeds from 20 to 40 miles per hour.

To obtain the factory setting, screw the range adjusting screw (B) in or out so the head is flush with the bushing. If the range adjustment is changed, it will be necessary to readjust the idle adjustments.

Power Adjustment.—The carburetor will give the best mixture for speed and maximum power on the hill when the bottom of the head of the power screw (J) Fig. 6 is setting so that it measures 7/32" to the arm that holds screw (J). On the later Duplex carburetor, there is a small pin located at the side of the screw (J) and the original factory setting is to have the bottom of the head on screw (J) flush with the bottom of the pin. In high altitudes, more power can be obtained by leaning up on the power mixture—turning screw (J) to the left (counter-clockwise) 3 to 5 complete turns. Turning screw (J) to the right richens the power mixture.

CARBURETOR SPECIFICATION DIAGNOSIS

Schebler Model S.—There are three points to be considered in the specification information for Schebler Model S carburetors; namely, needle valve assembly (B) Fig. 6A, air valve spring (A) and cross passage (E).

Needle Valve Assembly.—The amount of gasoline that is supplied to the main nozzle is determined by the taper of the needle valve. The ta-

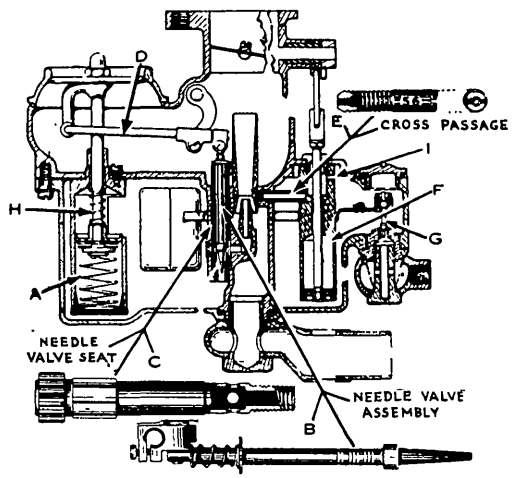


Fig. 6A

Cross sectional view of Schebler Model S carburetor showing (A) air valve spring; (B) needle valve complete; (C) needle valve seat; (D) needle valve lift lever; (E) accelerating pump metering or cross passage; (F) accelerating pump cylinder; (G) float needle valve assembly.

per of the needle is graduated in degrees and each needle valve is numbered by rings on the body of the needle as shown in Fig. 6A. A greater taper of the needle valve would mean a richer mixture and a straighter taper would mean a leaner mixture. It should be borne in mind, however, that while the needle taper is graduated in degrees, the rings on the body of the valve do not indicate the number of degrees of taper. The following table contains the needle valve number, part number, taper angle and number of rings found on the body of the valve.

Diagnosis, Needle Valve Taper too Great.—If the needle valve taper is too great, the car owner will probably complain of poor gasoline mileage.

A slight change in favor of a richer mixture cannot be noticed in the performance of the car since there is so great a range between the point of where the car will operate efficiently and where the mixture would necessarily need to be so rich that the car would load or give other indications other than poor gasoline mileage.

Diagnosis, Needle Valve Taper Too Straight.—If the needle valve taper is too straight, the mixture may be too lean and cause the motor to surge. The car would lack power on a hill with a tendency to hunt.

If trouble is experienced with a Schebler Model S carburetor and the symptoms indicate a defective needle valve action, check to see that the fulcrum arm (D) Fig. 6A is not worn causing the needle valve fulcrum lever to stick. This condition generally causes a too rich mixture.

Needle Valve Assemblies

The following table contains part number, needle valve assembly number and taper in degrees of needle valve used in Schebler Model S carburetors.

Part	No.	Taper Angle	No. of Rings
X1712	1	5° 32′	1
X1712	2	5° 8′	2
X1712	3	5° 20′	3
X1712	4	4° 40′	4
X1712	5	5°	5
X1712	6	6°	6
X1712	7	6° 26′	7
X1712	8	7° 37′	8
X1712	9	8° 34′	9
X1712	10	7°	10
X2205	1	6°	1
X2205	2	8°	2
X2205	3	10° 20′	3
X2205	4	11° 52′	4

Air Valve Spring.—The air valve spring is located in the dash pot as shown at (A) Fig. 6A and is for the purpose of controlling the action of the air valve.

If the air valve spring weakens in service, the tension against the air valve piston will not be great enough and a tendency toward a lean mixture will result. If a condition of weak air valve spring is encountered, replace with a new spring. These air valve springs are graduated to a certain tension and if they are stretched or distorted in any way, the balance of the carburetor may be disturbed.

The correct operation of the carburetor is largely dependent upon the correct tension of the spring (A). A table of air valve spring sizes will be found below.

Air Valve Spring

The following table lists the part assembly number, spring number, spring gauge size and number of coils for each model of Schebler Model S carburetors.

Part No.	No. of Coils	Length	Used On	Gauge
48S	12	2 7/8″ to 3 5/8″	1¼″ S	14
48I	8½	2¼″ to 2¾″	1½″ S	20
48R	8	2¼″ to 2¾″	1½″ S	16
48D	10	2″ to 2 1/16″	1¼″ S	16
48J	10	2″ to 2⅜″	1¼″ S	17
48U	10½	2⅝″ to 3⅛″	1″ to 1¼″ S	15
48CC	9½	2½″ to 3″	1¼″ S	20
48Y	10½	2¾″ to 3⅛″	1″ S	18
48X	10	2 1/16″ to 2 1/16″	1½″S	16
48BB	11	2 1/16″ to 2 11/16″	1¼″ S	16
48E	16	6½″	2½″ S	18
48DD	9	2½″ to 2¾″	1¾″ S	20
48FF	16	6½″	2″ to 2½″ S	20

Cross Passage.—The cross passage connecting the accelerating pump chamber with the venturi as shown at (E) Fig. 6A and control the amount of gasoline admitted to the venturi during acceleration. Pump cross passages are made in drill sizes and the number of the passage is stamped on the side of the cross passage body. In the table below, the length of the cross passage, size number and drill size in thousandths of an inch is given.

Diagnosis, Accelerating Pump Cross Passage too Small.—If the accelerating pump cross passage (E) Fig. 6A is too small, the car may have a flat spot on acceleration. This condition will generally be indicated by a popping back through the carburetor due to a lean mixture.

The proper procedure for locating a cross passage of the wrong size in cases where the cross passage is thought to be too small, is to increase the size approximately two drill sizes at a time until the motor just smooths out on acceleration.

Diagnosis, Accelerating Pump Cross Passage too Large.—If the accelerating pump cross passage is too large, the car will have a tendency to Roll and load on fast acceleration. This trouble is generally caused by someone unfamiliar with the proper calibration procedure drilling out the cross passage or replacing it with a cross passage that is too large. To correct this condition, try a smaller cross passage.

Needle Valve Seat.—When installing a new needle valve seat (C) Fig. 6A, screw the seat in until the gears stand at approximately the center of the pinion.

Table of Cross Passage Sizes

The following table contains the part number, length, size number, drill size in thousandths of an inch and model of Schebler carburetor on which the cross passages are used.

Part	Length	Size No.	Drill	Used On
S1446	1⅛″	52	.0635″	1″ Model "S"
S1446A	1⅛″	54	.055″	1″ " "S"
S1446B	1⅛″	56	.0465″	1″ " "S"
S1446C	1⅛″	58	.042″	1″ " "S"
S1446D	1⅛″	60	.010″	1″ " "S"
S1446E	1⅛″	50	.070″	1″ " "S"
S1446F	1⅛″	70	.027″	1″ " "S"
S1199	1 7/64″	52	.0635″	1¼″ " "S"
S1199A	1 7/64″	54	.055″	1¼″ " "S"
S1199B	1 7/64″	56	.0465″	1¼″ " "S"
S1199C	1 7/64″	58	.042″	1¼″ " "S"
S1199D	1 7/64″	60	.010″	1¼″ " "S"
S1199E	1 7/64″	50	.070″	1¼″ " "S"
S1199F	1 7/64″	48	.076″	1¼″ " "S"
S1586	1 7/64″	52	.0635″	1¼″ Die Cast "S"
S1586A	1 7/64″	54	.055″	1¼″ " "S"
S1586B	1 7/64″	56	.0465″	1¼″ " "S"
S1586C	1 7/64″	58	.042″	1¼″ " "S"
S1586D	1 7/64″	60	.010″	1¼″ " "S"
S1586E	1 7/64″	50	.070″	1¼″ " "S"
S1586F	1 7/64″	48	.076″	1¼″ " "S"
S1324	1 7/64″	50	.070″	1½″ " "S"
S1324A	1 7/64″	48	.076″	1½″ " "S"
S1324B	1 7/64″	52	.0635″	1½″ " "S"
S1324C	1 7/64″	54	.055″	½″ " "S"
S1324D	1 7/64″	56	.0465″	1½″ Model "S"
S1508	1 11/64″	54	.055″	1½″ " "S"
S1508A	1 11/64″	50	.070″	1½″ " "S"
S1508B	1 11/64″	52	.0635″	1½″ " "S"
S1508C	1 11/64″	56	.0465″	1½″ " "S"
S1652	1 7/64″	54	.055″	Special 1¼″
S1652A	1 7/64″	50	.070″	" 1¼″
S1652B	1 7/64″	52	.0635″	" 1¼″
S1652C	1 7/64″	56	.0465″	" 1¼″
S1578	1 11/64″	50	.070″	" 1½″
S1775	1 7/64″	52	.0635″	" 1½″
S1767	1 1/16″	52	.0635″	2-2½″ Model "S"
S1767A	1 1/16″	54	.055″	"
S1767B	1 1/16″	56	.046″	"
S1767C	1 1/16″	58	.042″	"
S1767D	1 1/16″	60	.040″	"
S1767E	1 1/16″	50	.070″	"
S1767F	1 1/16″	48	076″	"

Schebler Model U

An Air Valve Carburetor.—The Model U is an air valve carburetor, having two air inlets. Referring to Fig. 7, the auxiliary air valve (Y) is closed for idling, and wide open for full power. It is held in a closed position by the spring (H) and will not open until the suction in the body of the carburetor is great enough to compress the spring. The spring (H) is just strong enough to insure good atomization of the fuel. The pressure required to open the valve (Y) to its wide open position is very little greater than that required to barely crack it from its seat. Thus positive action at low speed is assured with the greatest possible capacity at high speed.

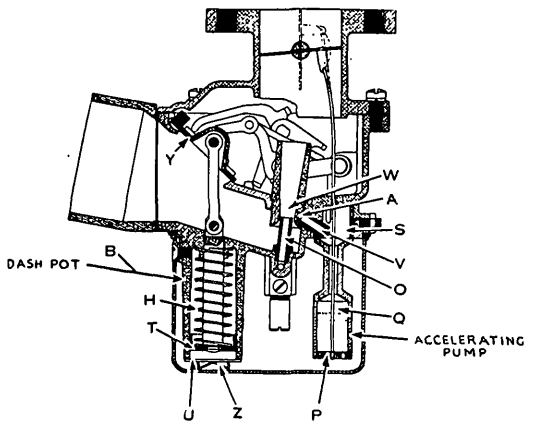


Fig. 7

Cross section of Model U Schebler carburetor showing (H) air valve spring; (O) main gasoline nozzle; (P) accelerating pump piston; (Q) accelerating pump assembly; (T) air valve piston; (U) dash pot release valve; (V) cross passage to venturi; (V1) cross passage metering hole; (W) venturi; (Y) air valve; (Z) dash pot cylinder release valve spring.

Action at Low Speed.—The fixed air opening is through a venturi (W) past the nozzle (O). The air for the venturi passes through the same opening at the intake to the carburetor as the air which goes past the air valve (Y). As it passes the nozzle (O) it picks up the proper amount of fuel and atomizes it, delivering it to the motor. As the air valve (Y) opens, the air passing this valve mixes with the mixture delivered from the venturi (W). The fixed air opening through the venturi (W) has two important parts to play. When the air valve (Y) is clamped down in the starting position and the needle valve (M, Fig. 8) raised to the starting position, a very rich mixture is delivered out of the venturi (W, Fig. 7), which produces a good starting condition. When the carburetor is operating normally, the fixed air opening through the venturi (W, Fig. 7) creates a high air velocity past the nozzle (O) and the fuel delivered out of the nozzle is torn up and atomized so that good low speed operation is obtained.

The Gasoline Passageway.—The gasoline enters the float chamber through the valve (R, Fig. 9), and the level is governed by the float (J). After leaving the float chamber, it is governed by the gasoline needle (M, Fig. 8). It then passes through the cross-drill (N, Fig. 10), into the nozzle (O, Fig. 7), and on into the air stream through the venturi (W).

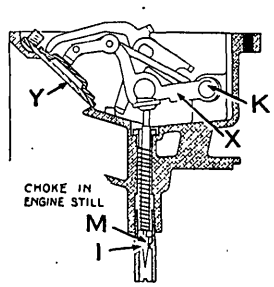


Fig. 8

Cross section of air valve and control levers Model U Schebler carburetor; (K) air valve lift lever fulcrum; (M) needle valve; (X) air valve life lever; (Y) air valve.

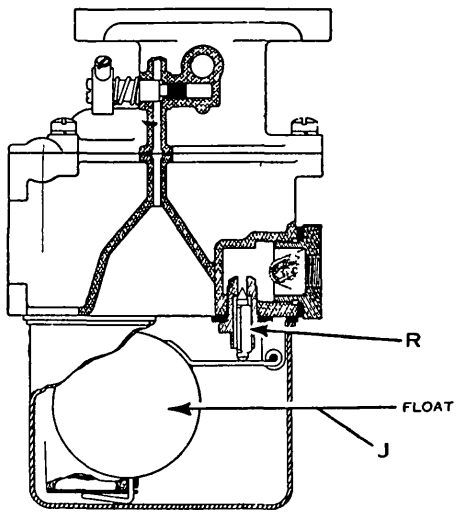


Fig. 9

Cross section of Schebler Model U carburetor showing float valve assembly and economy adjustment; (B) economy adjustment screw; (B1) economy adjusting lock; (J) float; (R) float needle valve assembly.

How the Mixture Ratio is Maintained.—The method of maintaining the correct fuel-to-air ratio is as follows: The motion of the air valve (Y, Fig. 8) is transmitted to the needle valve lift lever (X), which rotates about the axis (K), thus giving to the gasoline needle (M) a definite part of the air-valve motion.

The needle valve lift lever (X) is made of hardened steel, plated. The tolerances in the dimensions are very small, so that a most exact fit is maintained between all parts. This is done in order that the metering may always be exact, in an old carburetor as well as in a new one.

The Accelerating Pump.—When the throttle is opened suddenly, a certain portion of the gasoline will lag behind the air. This will cause the mixture reaching the cylinders to be temporarily leaner than the accurately metered mixture leaving the carburetor. If the carburetor is adjusted lean for economy, this temporary impoverishment of the mixture would cause the engine to misfire were it not for the accelerating pump (Q, Fig. 7) which causes the mixture leaving the carburetor to be temporarily enriched during acceleration.

Action of Accelerating Pump.—When the throttle is opened, the piston (P) of the accelerating pump is raised, lifting gasoline into the upper chamber (S). From here, the gasoline flows through the passageway (V) to the venturi (W), where it mixes with the air entering the carburetor. No gasoline at all will pass through opening (A) in passage (V) except immediately following an opening of the throttle so that the accelerating pump acts only during periods of acceleration.

Capacity of the Pump.—The capacity of the pump is large compared to the amount of gasoline used for accelerating. This is for a definite reason. When the throttle is opened just a few degrees from the idling position at low speed, the engine will be running under full load; and a full load charge of accelerating gasoline will be needed. The accelerating pump must therefore be able to deliver the full load charge of gasoline with just a few degrees of motion. On the other hand, no greater charge than this is needed when the throttle is opened wide. For this reason, an overflow is placed at the required height so that any excess gasoline pumped into chamber (S) will run back into the float chamber, and will not be wasted. While necessarily large the pump is therefore not wasteful.

Accurate Operation of Pump.—The amount of gasoline required for acceleration varies with the size, shape and temperature of the intake manifold. The Model U pump can be adjusted to any manifold. The rate of delivering the extra gasoline can be changed according to the size of the metering-hole (A, Fig. 7), and the total amount delivered according to the height of the overflow in the pump cylinder.

The Dash Pot.—Covering only the 1″ Size: The gasoline dash pot piston (T, Fig. 7), is used to prevent the fluttering of the air-valve (Y) when the engine is pulling hard at low speed. The relief valve (U) is held up against the bottom of the dash pot cylinder by the spring (Z) and allows the gasoline to flow out of the cylinder when the piston (T) drops with a closing of the air valve (Y). When the air valve (Y) opens, it raises piston (T) and the relief valve (U) holds closed, so that the piston (T) can only rise slowly since the gasoline must leak past the piston. This action prevents the valve from fluttering with wide open throttle at low speeds. The size of the piston relative to the cylinder is so determined as to prevent fluttering but not to cause any "loggy" action when the throttle is opened after "coasting" at high speed.

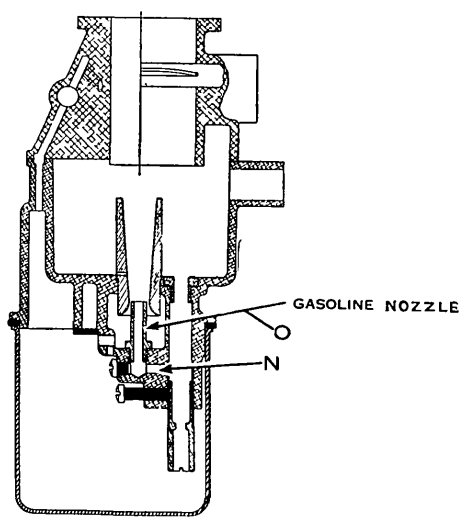


Fig. 10

Sectional view of Schebler Model U carburetor showing gasoline nozzle and cross passage (N).

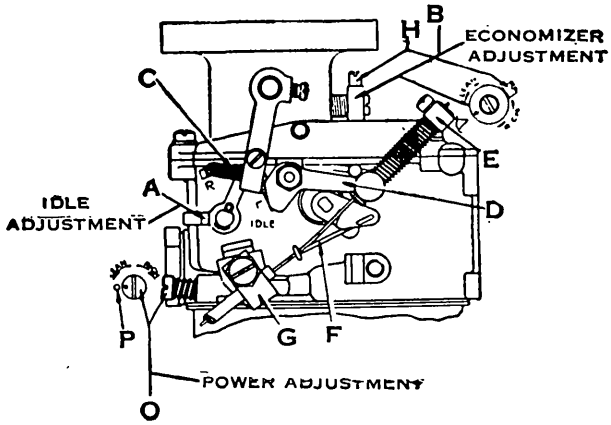


Fig. 11

Schebler Model U showing (A) idle adjustment; (C) idle speed adjustment; (B) economy adjustment; (O) power adjustment.

Dash Control for Starting.—The Model U has no choke. It delivers to the engine whatever air is needed, and meters the required fuel into that air. When a very rich mixture is needed, as in starting a cold engine, the dash control lever (D, Fig. 11), is pulled down by means of the wire (F). This will rotate the needle valve lift lever (X, Fig. 8), about the shaft and raise the gasoline needle valve (M), farther out of the needle valve seat; at the same time it will clamp the air valve (Y, Fig. 7); this action supplies a mixture to the manifold of the engine which is many times richer than normal, or in other words, the correct mixture ratio for quick and easy starting. As the engine speeds up, the effect of the initial lift of the needle will diminish, so that the percentage of excess gasoline will decrease but not disappear at high speed. This corresponds to the requirements of an engine, as a greater percentage of excess gasoline is required to run a cold engine slowly than fast.

The Starting Cam.—A feature of this carburetor is the starting cam which is a part of the dash control lever (D, Fig. 11). When the dash control is pulled out for starting, the throttle is opened to a position which insures easy starting and as the dash control is pushed in, the throttle opening is gradually diminished until with the control in the "down" or "run" position a normal throttle opening for idling is obtained. With the control in any "warming-up" position, a fast idle is obtained which is of benefit when an engine is cold or only partly warmed up.

Model U 1¼" and Larger Sizes.—The explanation just given covers the 1" Model U but these principles are identically the same as the ones used in the 1¼" and larger sizes of the Model U. The only slight changes made in the 1¼" and larger sizes are as follows:

Dash Pot.—The gasoline dash pot assembly (B, Fig. 7) acts the same as described under dash pot for 1" models but it is designed different. The dash pot piston for the 1¼" and larger sizes has a small washer assembled to it just above the bottom of the piston. This washer has six small holes drilled in the bottom. This small washer is forced upward when the piston (T) drops and allows gasoline to flow out of the cylinder when the air valve (Y) closes. When the air valve opens, the washer valve remains tight to the bottom of the piston so that piston (T) can only raise slowly since the gasoline must leak past the sides of the piston. This action prevents the air valve from fluttering with wide open throttle at low speeds.

Venturi Choke.—This feature was added to the 1¼" U and larger sizes so that a larger venturi could be used to give more power and better hill climbing performance. When dash control is pulled out for starting, in addition to locking the air valve, raising the needle valve and partially opening the throttle, the venturi choke is raised up around the top of nozzle (O, Fig. 7). This cuts down the air passage around the nozzle into the venturi and greatly increases the velocity of the air at this point. By increasing the velocity of the air at this point the gasoline coming out of the nozzle is picked up with great force and is thoroughly atomized as it enters the combustion chambers through the manifold. This feature aids materially in starting a motor instantly in the coldest weather.

The venturi choke is operated by the dash control which is drawn back and comes in contact with a steel wire fastened to venturi choke lever. As the dash control button on the dash is pulled all the way out, the dash control lever comes in contact with the steel wire arm fastened to lever, pushing the steel wire arm back about ½" and this action raises the venturi choke up on the nozzle, cutting down the size of the air passage between the nozzle and the venturi.

Idle Tube.—Another feature of the 1¼" and larger sizes of the Model U Schebler Carburetor is the adding of the Idle Tube, or sometimes called Scavenge Tube. This tube runs from the venturi at a point even with the floor of the carburetor body casting up to an extra air bleed hole in the carburetor flange. This tube enters into the venturi, it also has a small hole just outside the venturi next to the floor of the carburetor body casting and by running this on up to an air bleed hole which enters into the intake manifold it makes it possible to pick up any gasoline that may log behind. By gasoline "logging" behind we mean gas that may remain on the sides of the venturi or nozzle which would run back to the base of the venturi, or any gas that may remain on the sides of the carburetor throttle opening or in the intake manifold. The idle tube is incorporated in order to pick up this gas that may log behind and send it on into the combustion chamber through the small hole in top of the carburetor flange. This added feature makes it possible to get a lower and smoother idle and with this lower and smoother idle this Idle Tube also prevents the engine from stopping when quickly coming back to idle speed from high speeds.

CARBURETOR SPECIFICATION DIAGNOSIS

Schebler Model U.—The specification diagnosis information for Schebler Model U carburetor is practically the same as that for Model S with the exception that the symptoms of needle valve trouble are not quite so sensitive as those on Model S type.

Needle Valve Seat.—When installing a needle valve seat on a Schebler Model U carburetor, screw the seat up until it has full contact with the needle, then back away approximately one full turn. This position may not be quite correct but it provides a practical starting point for further adjustment if necessary.

CARBURETOR ADJUSTMENTS

Schebler Model U

Idle Adjustment.—The motor should be thoroughly warmed up before adjusting the idle (A) Fig. 11. The spark and throttle should be full retarded. Turning the end of lever (A) up leans the mixture and turning it down richens the mixture. The marking "R" and "L" on the body also show the rich and lean directions.

The correct idle adjustment should be obtained when pointer is approximately in the center of the range of adjustment between "R" and "L." Allow the motor to idle about one minute and if it Rolls from being rich, turn the adjustment lean one click at a time until the motor runs steadily. If the motor runs rough from being lean, turn the adjustment rich one click at a time until the motor runs steady. In warm weather, keep the idle adjustment slightly on the lean side. In cold weather, set the idle rich just under the Rolling point.

To change the idle speed adjustment, move idle stop screw (C) in or out to obtain the correct speed. Screwing (C) in will speed up the motor and vice versa. It may be necessary to change the idle adjustment (A) if the idle speed is changed very much. The correct speed is five miles per hour in high gear on level road.

Economy Adjustment.—The factory setting of the economy adjustment (B) Fig. 11 is shown with the arrow mark on the adjustment in line with the arrow mark on the body. To lean the mixture, turn the adjustment in the lean direction or counter-clockwise and to richen the mixture, turn the adjustment in the rich direction or clockwise.

To accurately check the economy adjustment, warm the motor up thoroughly. Next retard the spark all the way if the motor has manual control on spark. Next with car standing still, speed the motor up to a speed corresponding to approximately 30 miles per hour road speed. Do this with the throttle control on the steering wheel so that you can maintain the speed while checking the economy adjustment. With the motor turning over at this speed, loosen the lock screw (H) Fig. 11 and turn the economy screw (B) out (counter-clockwise) until the motor falters or begins to surge and slow down and at this point, turn the adjusting screw (B) in (clockwise) until you just get away from the surging point and the motor is hitting on all cylinders. This will give you an accurate setting on the economy adjustment. Be careful not to turn screw (B) in too far because if you do you will have a rich setting on economy, but turn it in just enough to get away from the surging of the motor.

After checking this adjustment accurately, hold the economy adjusting screw (B) so it will not move and turn the collar so that the arrow on the collar is in line with arrow on the body and then lock the collar by tightening set screw (H).

Note: Changing economy adjustment does not effect idle adjustment in any way.

Power Adjustment.—The wide open throttle adjustment can be richened by turning power adjustment screw (O) Fig. 11 in (clockwise) and can be made leaner by turning it out (counter-clockwise).

This adjustment should generally be used only for high altitude conditions or when special fuels are used. The factory setting for this adjustment is when the head of screw (O) is flush with the end of the pin (P) at the side of the screw and the punch mark on (O) pointing to pin (P).

This adjustment affects the economy adjustment (B) and if any change is made in power adjustment (O), the economy adjustment (B) will have to be reset as explained above by setting just above the surging point of the motor. If power adjustment (O) is richened say one fourth turn, then lean (B) economy adjustment one fourth turn or if (O) is leaned one fourth turn, then richen (B) one fourth turn.

Remember that the power or wide open throttle adjustment is correct when it leaves the factory except for special cases as mentioned above. Also, remember that it is very important to reset economy adjustment (B) if any change is made in adjustment (O).

The power adjustment is not used on the 1" size carburetors.

Schebler Model T

The Model T. Schebler is of the plain tube type in which a single fixed size venturi is used. Normally all the air except that which passes through the idle air bleed and idle system passes through this fixed venturi. All the metered fuels except the idle fuel and warming up and starting fuels passes through a nozzle whose tip extends into the throat of the venturi and the fuel mixes at the throat of the venturi with the air passing through. There are no moving parts controlling the normal metering of the fuel except a throttle operated metering pin which only changes a fuel feed opening from one size to a larger size when the throttle is wide open.

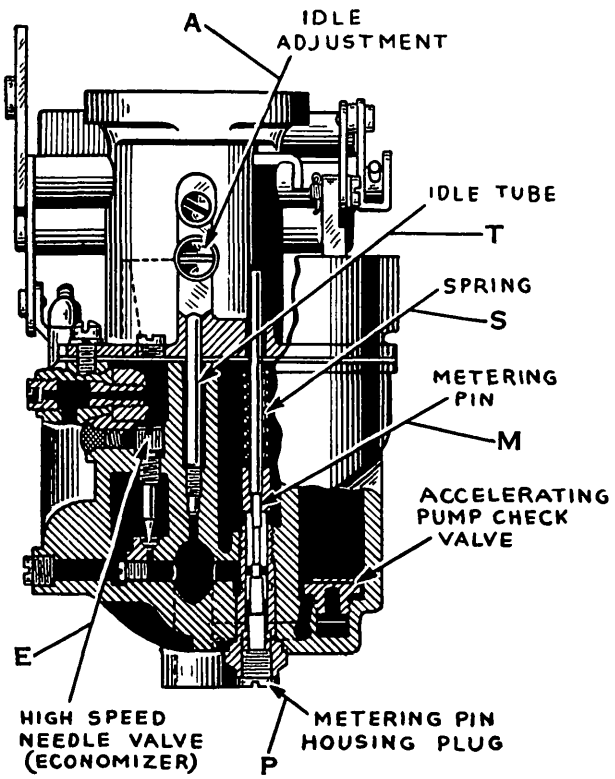


Fig. 12

Cross section end view of Schebler Model T carburetors showing concealed high speed needle valve or economizer adjustment (E), metering pin (M), accelerating pump check valve and idle tube (T).

High Speed or Economizer Adjustment.—In order to insure very close factory flow bench setting for each and every carburetor, a factory high speed needle valve (E) Fig. 12 is included in the Model T carburetor. This adjustable valve allows a small amount of gasoline to be fed past it into the nozzle system. The metering pins (M) are made to give slightly leaner mixtures than desired and the extra gasoline is fed past the high speed needle valve (E). The needle valve is never seated but is always partly open after the carburetor is given the factory flow when this valve is adjusted.

This adjustment should not be removed or changed except in the case of absolute necessity. Should it be necessary to remove the needle, first seat the needle counting the number of clicks required to seat it; be very careful and do not jam the needle on the seat as this will render it useless. To reassemble the needle, screw it down to its seat and then back off the required number of clicks to give the original setting. The factory setting of this needle is approximately 7 clicks from the seat. Any further adjustment must be made when tuning the motor. If the engine is running rich, turn the needle clockwise to lean and counter-clockwise to richen, should the engine be running lean.

The Idling System.—In plain tube carburetors it is necessary to supply the idle gasoline from the throttle disc because at idle the air flow through the venturi is so small that it will not pick up gasoline from the main discharge nozzle. The idle tube (T) Fig. 13 draws its fuel out of the main nozzle (N), through a passageway provided for this purpose. At each end of the idle tube is a calibrated hole of small diameter. The gasoline passes through these metered holes in the idling tube and enters passage (B) where it mixes with air admitted past the idle screw adjustment. This mixture of idle gasoline and air then passes into the throttle chamber through the idling openings above and below the throttle as shown in Fig. 13.

When the throttle disc is closed at idle, the calibrated hole above the throttle feeds gasoline to the engine and the opening below the throttle acts as an air bleed hole but when the throttle is cracked and gradually opens, the hole or idling jet below the throttle is exposed to the suction created above the throttle disc and starts delivering a mixture of fuel and air to the engine. In this way, an increased flow of gasoline passes through the idling system as the throttle is opened until the main nozzle starts delivering fuel.

The idle or low speed adjustment (A) adjusts the air bleeding so that the idle mixture can be leaned or richened as desired. Air is admitted to this valve through the main air bleed passage. If the valve is screwed in clockwise, the air bleed will be shut off and more gasoline will be drawn through the idle tube making the idle richer. If the valve or idle adjustment is screwed out (counter-clockwise) more air will be bled in and the suction on the idle tube will be reduced thus causing it to pass less gasoline which will lean the mixture.

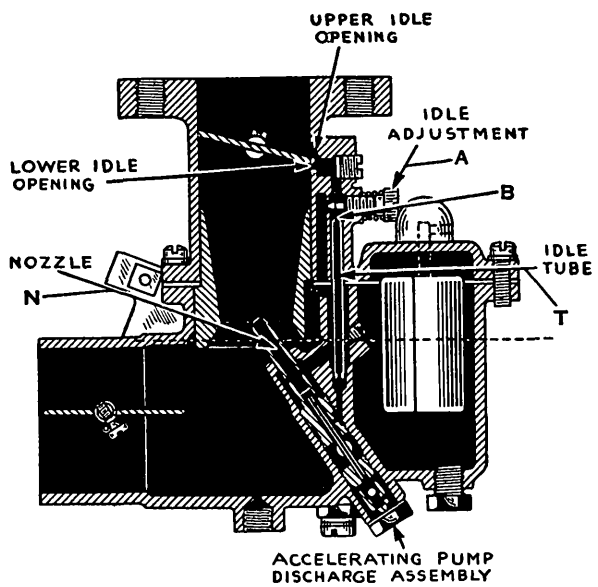


Fig 13

Cross sectional view of Schebler T carburetor showing main discharge nozzle and idling system As shown in the illustration, two idling jets are provided, one above the throttle and the other below the throttle The idle opening above the throttle feeds the engine fuel during closed throttle position and the idle jet below the throttle comes into action as soon as the throttle valve is slightly opened. The idle adjustment (A) is an air bleed valve which admits air to the idling mixture, thus screwing it out gives a leaner mixture and screwing it in to its seat gives a richer mixture.

Metering Pin.—The metering pin (M) Fig. 12 is made with two different size parts which register with the orifice in the metering pin housing. When the throttle is anywhere up to about three-fourths open, the pin size registering with the orifice is comparatively large so that a lean economy flow of gasoline passes into the nozzle. When the throttle is opened wide, the metering pin is depressed or pushed down by the arm on the accelerating pump lever yoke link on the pin assembly so that a smaller size of the pin registers with the orifice in the housing allowing more gasoline to pass to the nozzle. It can readily be seen that the smaller the diameter of the pin registering with the orifice, the more gasoline will flow because the opening between the pin and orifice will be larger.

The metering pin is guided at the top by the metering pin housing and at the bottom by the metering pin guide which fits into the bottom of the housing. The guide is held in by the metering pin housing plug (P) Fig. 12 which is sealed against gasoline leakage by a gasket. All these parts must be true and concentric and the pin must not be bent. The spring (S) pushes up against the collar on the pin thus holding the metering pin up until the throttle pushes it down through the assembly.

In action, the throttle can be moved anywhere up to three quarters open and the carburetor will operate on a lean economy setting and when the throttle is pushed completely open the carburetor will deliver a rich power mixture. The economy mixture extends ordinarily from 15 to 60 miles per hour at steady running on level road.

Accelerating Pump.—The accelerating pump used in the Schebler Model T carburetors is of the type that continues to discharge gasoline for a limited time after the throttle is opened. The pump consists of a cylinder in the carburetor lower half as shown at (D) Fig. 14; an accelerating pump check valve (V) at the bottom of the cylinder, an accelerating pump piston and stem assembly, an accelerating pump lever yoke link and pin assembly, an accelerating pump secondary piston (F) and the necessary guides and connecting screws.

In operation when the throttle is opened, the pump stem assembly is pushed down forcing gasoline through the passage into the accelerating discharge tube assembly and out of the tube into the main discharge nozzle. While the accelerating pump piston and stem assemblies are traveling down, some of the gasoline under the lower piston passes up through the hole in the lower piston and holds back the secondary piston. When the pump assembly stops moving downward, the secondary piston (F) then forces the gasoline between it and the lower piston down through the passage in the lower piston and eventually out of the accelerating discharge tube and nozzle. This last action enables the pump to deliver for a short time after the throttle is opened and causes quite a distinct gain in accelerating ability at low speeds.

During the above operation, the check valve (V) remains closed to prevent the pump from discharging back into the carburetor bowl.

On the upstroke of the pump and the closing of the throttle, the secondary piston is in contact with the lower piston, thus closing off the holes through the lower piston (D) and enabling the pump piston to draw in a charge of gasoline from the bowl through the check valve (V). On the same upstroke of the pump piston the small check valve in the bottom of the main discharge nozzle (N) Fig. 13 closes and does not allow fuel to be drawn back into the pump out of the nozzle. Excess gasoline runs back into the bowl from the nozzle through an overflow passage.

It will be noticed that a piston spring (G) Fig. 14 bears against the pump stem. The pressure of this spring is just enough to hold the piston assembly from dropping of its own weight. The pump link (L) is slotted where the pivot screw extends through into the stem. In operation when the throttle is closed the steam is pulled up to the top of its stroke; when the throttle is opened slightly, the slot in the link allows the stem to remain at the top of the stroke until all the slack has been used up. This slack amounts to about 1/16″ on the link in most cases. The result of this slack in the motion between the link assembly and the pump stem is to allow the throttle to be opened slightly before the accelerating pump begins to discharge and removes a heavy bump when the throttle is tipped in after coasting from 15 to 25 miles per hour.

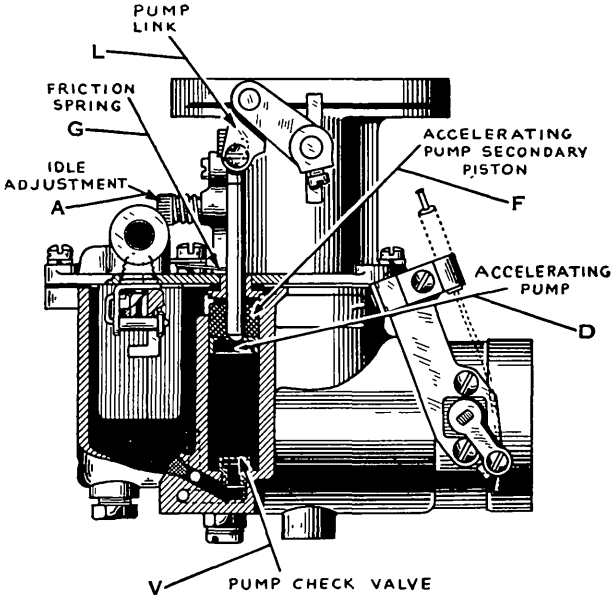


Fig. 14

Sectional view of Schebler Model T carburetor showing the accelerating pump assembly. The accelerating pump consists of a main accelerating pump piston (D) and a secondary accelerating pump piston (F). The pump piston (D) is operated by the pump link (L) which is connected to the throttle valve shaft. When the throttle valve is suddenly opened, the pump piston (D) is forced downward feeding gasoline to the main discharge nozzle. A certain amount of the fuel below the piston (D) escapes through the holes in the top of the piston and the movement downward of the secondary piston (F) prolongs the charge to the main discharge nozzle.

Warming Up Needle Valve.—The idle opening lever (R) Fig. 15 operates the warming up needle valve (W) in addition to operating the throttle when the air intake shaft assembly is moved toward the choke position. When the choke is opened or in the "run" position, the valve (W) is always seated. When the choke is in the partly or fully closed position, the needle valve (W) is raised and supplies extra gasoline to the motor.

The purpose of the warming up needle is to furnish extra gasoline during warming up and also extra fuel for starting. The fuel delivered during the warming up period or with the dash control partly pulled out has no effect at idle but is delivered the same as the fuel in the nozzle, that is the warmed up gasoline is delivered at a considerably higher speed than idle.

CARBURETOR ADJUSTMENT

Schebler Model T

Low Speed (Idle Adjustment).—To check the idle adjustment, warm up the motor thoroughly and by that is meant to have a hot motor. Close the throttle, retard the spark all the way if the car has a manual spark control and then adjust the idle stop screw (B) Fig. 15 until the motor will not idle less than 5 miles per hour on a level road. Be sure to lock the clamp screw after adjusting the screw (B). The idling mixture is made leaner by turning the valve screw (A) out (counter-clockwise) and richer by turning it clockwise, or in. With the idle screw (A) screwed all the way in, the idle should be rich and the engine should Roll. Turn the screw (A) out a little at a time until the motor no longer Rolls but runs smoothly. This will give a smooth idle adjustment. In cold weather carry the idle just under or slightly leaner than the Rolling point and in warm weather just over or slightly richer than the lean faltering point.

High Speed Adjustment.—The high speed adjustment is controlled by the high speed needle (E) Fig. 12 and this is located inside the carburetor as shown. A small body plug at the left of the idle adjustment (A) can be removed from the carburetor body; then a small slender screwdriver can be inserted down through this hole into the slot of the high speed adjusting screw and in this way the high speed gasoline can be made rich or lean. Turning the high speed adjustment to the left or counter-clockwise gives a richer mixture and to the right or clockwise gives a leaner mixture. This adjustment should never be changed from the original factory setting except under very special conditions such as high altitudes and in exceptional hot climates where a very high grade of fuel is always used.

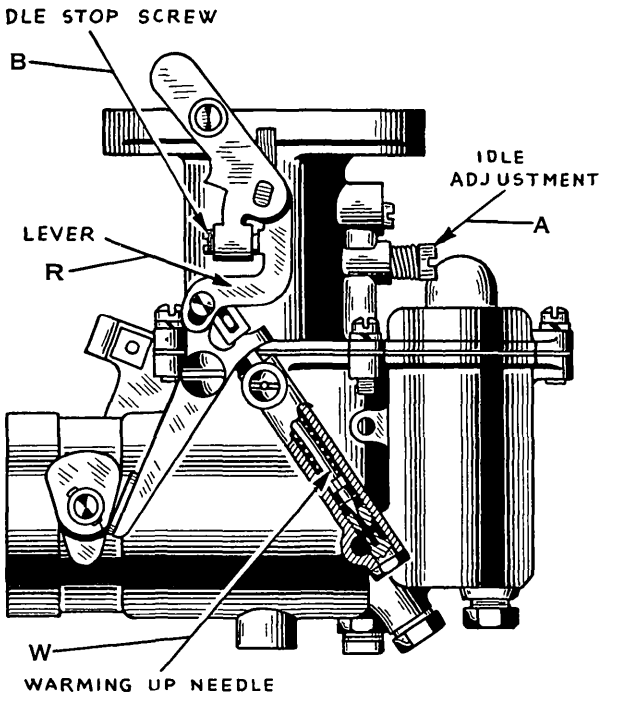


Fig. 15

Cutaway section of Schebler Model T carburetor showing the auxiliary warming up needle (W) which is operated through the medium of the lever (R) which in turn is connected to the choke lever. The warming up needle (W) supplies an extra amount of fuel to the venturi through a system of passages for starting and cold motor running conditions.

Stromberg Carburetors

How to Read Stromberg Model Numbers.—The first letter of a Stromberg Model designation indicates the type. The following letter indicates some special form of this type while the numeral following the hyphen indicates the normal rated size of the carburetor, the size starting from 1″ which is No. 1 and increasing in ¼″ steps. For example, take a U type carburetor. A U-1 has a 1″ throat while a U-2 has a 1¼″ throat. The actual diameter of the carburetor opening is 3/16″ greater than the nominal rated size in accordance with the standard of the Society of Automotive Engineers.

An "X" in the model symbol indicates that the carburetor flange bolt holes are at right angles to the line of air entrance and the float chamber, the carburetor being usually installed so that the throttle shaft is parallel to the engine crankshaft and the line of the intake manifold. The letter "V" in the model symbol indicates that the new Vis-a-Gas strainer is incorporated in the float chamber cover of the carburetor designated as "TV" or "TXV".

Stromberg DX-3

The D series of Stromberg carburetors are the latest Stromberg development and are similar to the U type in most respects with the exception that the D carburetors are down draft and the U carburetors are up draft.

The air stream enters the carburetor at the top. Gasoline sprayed from the sides of the main discharge jet is carried down with the air stream aided by gravity past the throttle valve at the bottom of the carburetor and through into the engine manifold. (See Fig. 1).

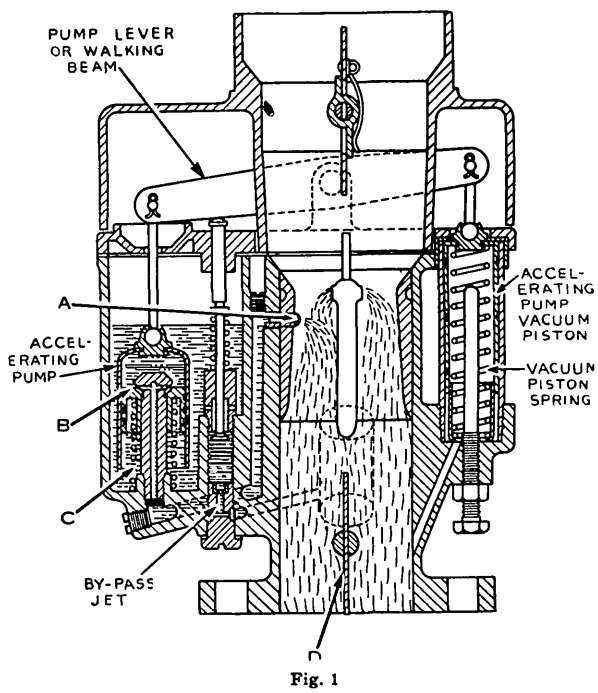


Fig. 1

Cross sectional view of Stromberg Model DX down draft carburetor showing the accelerating pump action. The throttle valve is shown in the wide open position with the pump delivering an extra charge of gasoline through the pump discharge jet (A).

The regular syringe accelerating pump used in the down draft models being operated by a vacuum piston instead of mechanically as in the other types. The vacuum piston is placed alongside the mixing chamber. Its lower end connected to the chamber just above the throttle. The upper end of the piston is connected to a walking beam at the other end of which is the accelerating pump.

The device operates as follows: As the throttle is opened, the vacuum in the manifold decreases to the point of where the vacuum piston is released and forced up by a spring. This action pushes the walking beam up at the one end and down at the other, setting the accelerating pump into action. The action of the pump is exactly like that on the U type carburetor.

A special feature of the down draft models is a spring device on the choke valve to prevent overchoking. When starting with the choke closed the suction in the carburetor increases. When this suction rises past a certain point a small spring holding a valve plate on the choke (see Fig. 2) is forced open allowing a sufficient amount of air into the carburetor to prevent overchoking the engine.

CARBURETOR ADJUSTMENT

Stromberg DX-3

The mixture of the operating range is determined by the diameter of the main metering screw (10) Fig. 3. If due to unusual weather conditions a richer or leaner mixture is necessary, a metering screw can be changed for one of proper size.

Low Speed Adjustment.—Have the engine well warmed up so that the intake pipe above the carburetor is at least warm to the hand; then slow the engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached. Turn the low speed adjustment (3) Fig. 3 gradually to the right or left until steadiest running and fastest running for that throttle position is obtained. This adjustment operates on air so that screwing it in gives a richer mixture, out a leaner mixture. If after this adjustment is made the engine idles too fast, turn the small throttle stop screw (5) Fig. 3 counter-clockwise to reduce the minimum throttle opening until the desired idling speed is reached. If the engine idles too slow as shown by its Rolling and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed.

If after everything has been checked it is still impossible to get a satisfactory idle adjustment, remove plug (26) and see that the two holes near the lip of the throttle valve are open and clean. Also, remove idle tube (27) and see that the small hole in the end is open and that air can be blown through the tube.

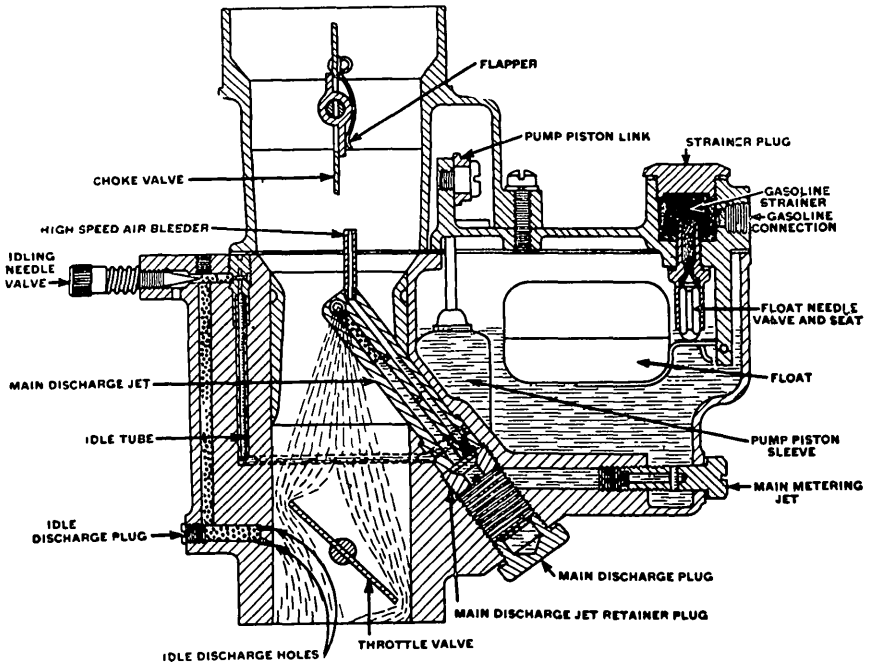


Fig. 2

Cross sectional view of Stromberg Model DX carburetor showing the arrangement of the main discharge and idling jets. The high speed air bleeder for the main discharge jet is mounted in the end of the jet as shown. The main discharge jet for all DX Stromberg carburetors is not changeable as to specifications and under no consideration should the high speed air bleeder or jet discharge holes be drilled out.

If trouble should be experienced at idling speed, remove the idle discharge plug and check to see that the idle discharge holes are not plugged up The idle discharge holes are made in the body of the carburetor and under no consideration should these holes be drilled out.

Intermediate Speed.—The mixture at intermediate speed is controlled by the size of the main metering orifice (10) Fig. 3. The size of this metering orifice is stamped on the outer face of the jet in decimal parts of an inch. This metering orifice has been calibrated at the factory to supply the proper amount of fuel and should not be changed without special instructions.

At wide open throttle an additional quantity of fuel is supplied by the by-pass metering jet (20) Fig. 4.

Accelerating Pump Adjustment.—The mixture from the accelerating pump is adjustable and should be changed for winter and summer. In the winter a greater discharge from the pump is desirable. This can be altered by loosening the lock nut (7) Fig. 3 and screwing up clockwise on the screw (6). This cuts down the accelerating pump charge and is the summer adjustment. Screwing down or counter-clockwise on the screw (6) is the winter adjustment. Be sure to tighten the lock nut (7) after adjusting.

Pump Stroke Adjustment.—Accelerating pumps on all Model D series carburetors are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of the screw (6) Fig. 3.

A condition may prevail whereby the pump stroke adjustment is so close that it is difficult to determine whether the stroke is too long or too short. In these cases, if shortening the pump stroke improves the motor performance the stroke was too long but if the stroke is too short then shortening the stroke will aggravate the condition.

If the pump stroke is too short, the car owner may complain that the motor hesitates and stumbles accompanied by a sputtering in the carburetor. This condition may also cause the motor to die in traffic on deceleration after a quick acceleration.

To check, first try the car on the service floor by accelerating the motor from idle to high speed several times always dropping back to idle for at least 10 seconds, each time after speeding up the motor. The object of this test is to get the motor to sputter in the carburetor. The pump stroke setting may be so close that the motor may not sputter for several trials. If adjustment is so close that the motor will not sputter, try shortening the stroke until the motor does sputter. (If the pump stroke happens to be too long, shortening will improve the motor performance). After the test is completed, lengthen the pump stroke until the motor runs smooth.

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model DX-3.—The working principle and internal parts for all Stromberg Model D series carburetors used on the different makes of automobiles are practically the same. The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments made.

Occasionally carburetor specifications will be changed by drilling out the jet openings; take for example the idling jets or the air bleeders. In

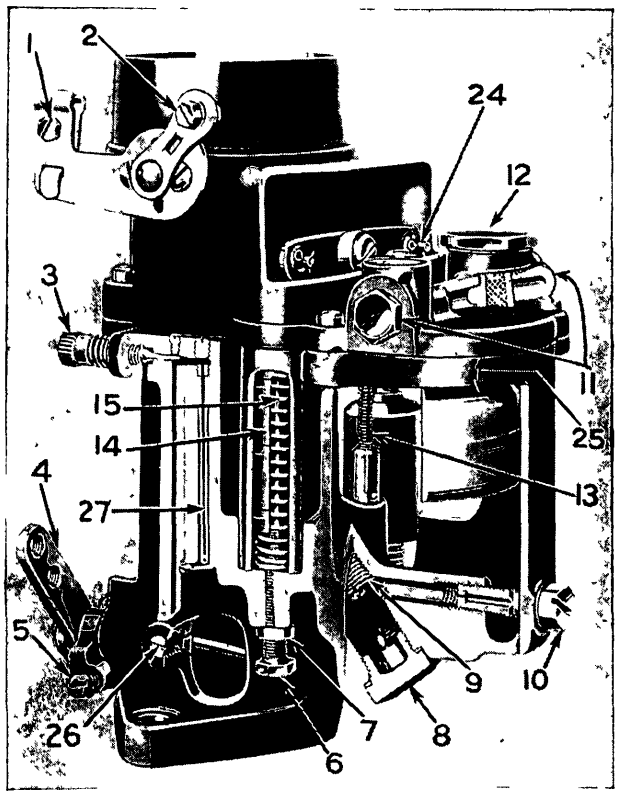


Fig. 3

Cross sectional view of Stromberg Model DX carburetor showing (1) choke control tube holder, (2) choke lever wire clamp screw; (3) idling needle valve, (4) throttle lever, (5) throttle stop set screw, (6) pump adjustment nut screw, (7) vacuum piston stop screw lock nut, (8) main discharge plug, (9) main discharge jet retainer plug, (10) main metering jet, (11) gasoline connection, (12) strainer plug, (13) economizer needle valve, (14) vacuum piston, (15) vacuum piston spring, (24) pump piston link, (25) float setting, (26) idle discharge plug, (27) idle tube.

many cases these openings are made in the carburetor body. It is not good practice to drill out these openings since this will necessitate installing a new carburetor body in order to obtain the original correct jet size.

There are seven places at which the internal adjustments of a Model DX carburetor may be changed to affect its operation. When attempting to determine these changes, the work is done in order as given below.

Idling Discharge Jets (Stromberg DX-3).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered, but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets too Large.—If the idling jets are too large the motor will Roll and load regardless of how much air is admitted through the idle adjustment; also, the motor will have a tendency to idle fast with the throttle completely closed.

Main Metering Jet (Stromberg DX-3).—The main metering jet or high speed adjustment (10) Fig. 3 controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the main metering jet is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available steep enough for testing, the trouble can be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the car will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on first test) and test the car again with wide open throttle in second gear. If reducing the metering jet corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor, accompanied in most cases with a lack of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-fourth throttle.

The symptoms produced by a main metering jet of the wrong size may be confused with a by-pass jet of the wrong specification. If after changing the metering jet to a larger or smaller size the

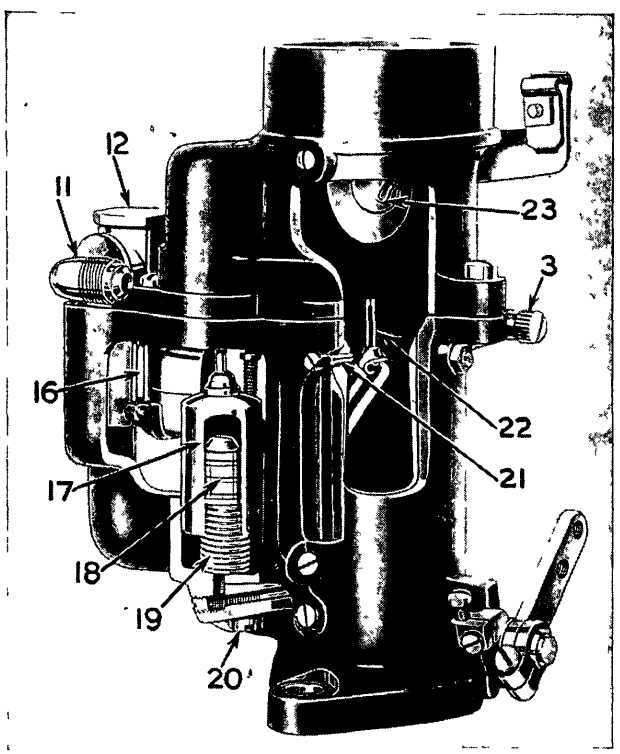


Fig. 4

Cutaway section of Stromberg Model DX carburetor showing (3) idling adjustment, (11) gasoline connection, (12) strainer plug; (16) float needle valve and seat, (17) pump piston sleeve, (18) pump piston, (19) pump piston spring, (20) by-pass metering jet (economizer), (21) pump discharge nozzle; (23) choke value (flapper valve).

trouble still exists or is aggravated, the by-pass jet should next be checked.

Economizer By-Pass Jet (Stromberg DX-3).—The purpose of this jet (see Fig. 1) is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet, namely, the by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large.—If the by-pass jet is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available steep enough for test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle condition. When reducing the size of the by-pass jet, the following instructions are recommended. If the by-pass jet in the carburetor is over .040" try five sizes smaller. However, if the by-pass jet in the carburetor is less than .040" try two sizes smaller on first test.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult.

Diagnosis, By-Pass Jet too Small.—If the by-pass jet is too small the car owner may complain of lack of power and speed on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where, when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up.

A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jet (Stromberg DX-3).—The main discharge jet on all Stromberg Model DX carburetors are not changeable. By this is meant that the nozzle or jet is not changeable so far as specifications are concerned and under no consideration should these jets be drilled out or changed.

High Speed Air Bleeder (Stromberg DX-3).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeder should be avoided as far as possible.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In some cases, the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle, a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open. Before making the hill test as described above, the car should be tried out under level road conditions.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass that is too large. To test the car under level road conditions, first replace the air bleeder with a larger size (not to exceed four sizes larger on first test). It should be remembered, however, that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passageway is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved but if no change is noticed or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Accelerating Pumps (Stromberg DX-3).—Accelerating pumps on all Model DX carburetors are controlled by vacuum. Adjustment of the pump consists of regulating the length of the stroke by means of the screw (6) Fig. 3.

A condition may prevail whereby the pump stroke adjustment is so close that it is difficult to determine whether the stroke is too long or too short. In these cases if shortening the pump stroke improves the motor performance, the stroke was too long. But, if the stroke is too short, then shortening the stroke will aggravate the condition. See diagnosis below.

Diagnosis, Pump Stroke too Short.—If the pump stroke is too short, the car owner may complain that the motor hesitates and stumbles accompanied by sputtering in the carburetor. This condition may also cause the motor to die in traffic on deceleration after a quick acceleration.

To check, first try the car on the service floor by accelerating the motor from idle to high speed several times, always dropping back to idle for at least 10 seconds, each time after speeding up the motor. The object of this test is to get the motor to sputter in the carburetor. The pump stroke setting may be so close that the motor may not sputter for several trials.

If adjustment is so close that the motor will not sputter try shortening the stroke until the motor does sputter. (If the pump stroke happens to be too long, shortening will improve the motor performance.) After the test is completed, lengthen the pump stroke until the motor smooths out.

Important: After adjustment of the pump stroke is completed, check the car out on a level road for proper accelerating performance.

Diagnosis, Pump Stroke too Long.—If the pump stroke is too long, the car owner may complain that on acceleration the motor will hesitate and Roll, accompanied by an unpleasant jerking followed by the motor smoothing out.

To check, first test the car on the service floor. On quick acceleration, the motor will have a tendency to stumble and Roll and on deceleration the motor may run rich for 10 or 15 seconds and even die.

On a road test, the motor will stumble and hesitate on acceleration and then run rich for from 40 to 50 feet. To correct, shorten the pump stroke.

Venturi Tubes (Stromberg DX-3).—All venturi tubes on Stromberg Model DX carburetors are removable and are held into the carburetor body by a set screw and lock nut. In practice it is seldom that trouble from a venturi tube of wrong size is experienced. However, if this trouble is encountered, a check to see that the venturi is tight in the carburetor body should be made before testing for wrong size.

Diagnosis, Venturi Tube too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi Tube too Small —If the venturi is too small the motor will have good power on acceleration at wide open throttle under 25 miles per hour, but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to Roll and load On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Stromberg DD

The Stromberg Model DD series carburetors are of the two barrel down draft type and resembles closely in general principles the single barrel D type. A special gear arrangement operates the two throttle valves. The idling and other adjustments are similar to those required for the UU models.

CARBURETOR ADJUSTMENT

Stromberg DD

With all dual carburetors the idling adjustment is somewhat sensitive due to the fact that the throttle opening when the engine is idling is only about .003" wide or half that needed with a single carburetor of the same capacity. The idle adjustment regulates the fuel so that screwing it out gives a richer mixture and inward a leaner mixture.

Low Speed Adjustment.—Have the engine well warmed up so that the intake pipe below the carburetor is at least warm to the hand then slow the engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached.

The idle adjusting screws, one for each barrel, are shown at (3) Fig. 5. If the engine idles too fast, turn the small throttle stop screw (5) Fig. 6 counter-clockwise to reduce the minimum throttle opening until the desired speed is reached. If engine idles too slowly as shown by its Rolling and stalling easily, screw the throttle stop screw inward or clockwise to increase the minimum idling speed. Disconnect the spark plug wires on the four cylinders fed by the outer barrel of the carburetor and adjust the inner barrel until steadiest and fastest running is obtained then connect the spark plug wires for the cylinders fed by the outer barrel and disconnect the spark plug wires to the cylinders fed by the inner barrel and adjust the outer barrel of the carburetor to steadiest and fastest idling. After both sets of four cylinders have been adjusted it may be necessary to check again the inner idling adjustment cutting it down slightly. Both idle adjustments should preferably be made slightly on the rich side. If after the above adjustment is made the engine idles too fast or too slow, readjust the throttle stop screw (5).

Synchronizing Throttle Valve.—Twin carburetors will idle the engine on a very small throttle opening; therefore it is necessary that the two throttle valves be accurately synchronized so they will open together and pass the same amount of air while the engine is idling. If after the throttle stop screw (5) has been set for correct idling speed and the engine idles erratically the screw (29) Fig. 5 (which is originally set at the factory) may be used to synchronize the throttle to uniform opening. Turning screw (29) clockwise opens the throttle in the left barrel of the carburetor and turning it counter-clockwise closes it without disturbing the position of the throttle valve in the other barrel. The engine should idle evenly when both throttles are properly synchronized.

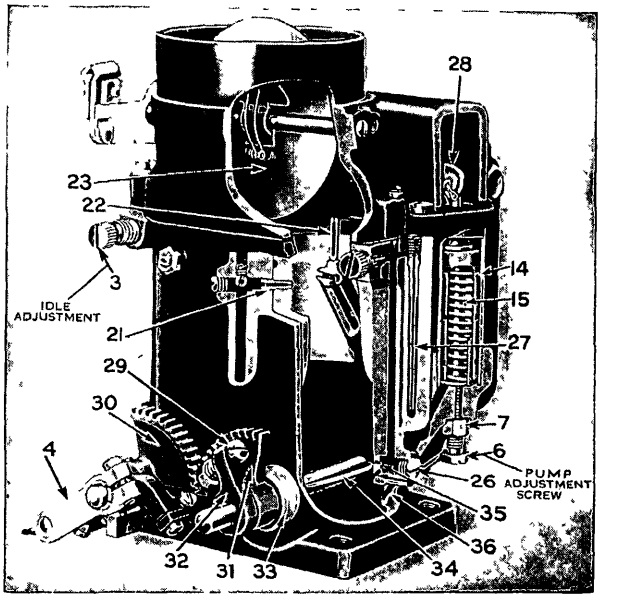


Fig 5

Cutaway section view of Stromberg DD carburetor showing (3) idling needle valve, (4) throttle lever; (6) pump adjustment screw, (7) pump adjustment screw lock nut, (14) vacuum piston, (15) vacuum piston spring, (21) pump discharge nozzle, (22) high speed air bleeder, (23) choke valve, (26) idle discharge plug, (27) idle tube, (28) pump lever, (29) throttle synchronizing screw, (30) throttle gear (right), (31) throttle gear (left), (32) throttle synchronizing lever, (33) throttle return spring; (34) throttle valve, (35) idling discharge hole; (36) economizer suction hole.

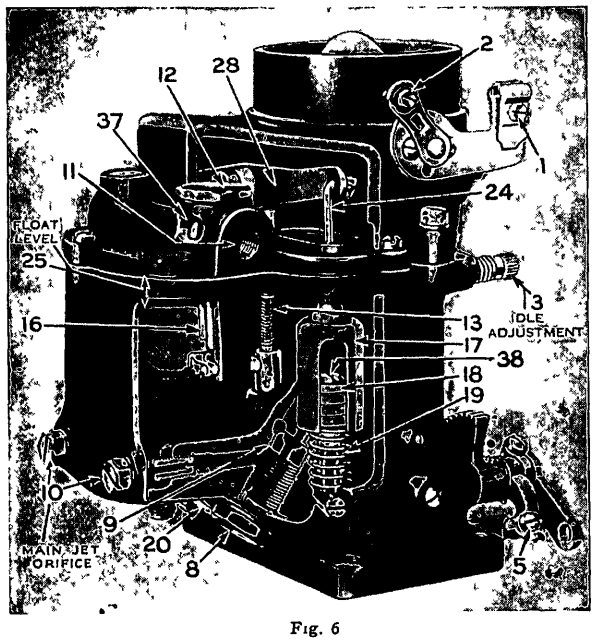


Fig. 6

Cutaway sectional view of Stromberg DD carburetor showing (1) choke control tube clamp screw, (2) choke lever wire clamp screw, (5) throttle stop set screw, (8) main discharge nut, (9) main discharge jet retainer plug, (10) main metering jet; (11) gasoline connection, (12) strainer plug, (13) economizer needle valve, (16) float needle valve and seat, (17) pump piston sleeve, (18) pump piston, (19) pump piston spring, (20) by-pass metering jet (economizer), (24) pump piston link; (25) float setting, (28) pump lever, (37) gasoline strainer, (38) pump stud.

If after everything has been checked it is still impossible to get a satisfactory idling adjustment remove plug (26) Fig. 5 and see that the two holes near the lip of the throttle valve are open and clean; also remove idle tube (27) and see that the small hole in the end of it is open and that air can be blown through the tube. Check to see that the end of the idle tube does not strike bottom of the hole.

Intermediate Speed.—The mixture at intermediate speed is controlled by the size of the main metering orifice (10) Fig. 6 The size of this metering orifice is stamped on the outer face of the jet in decimal parts of an inch. This metering orifice has been calibrated at the factory to supply the proper amount of fuel and should not be changed without special instructions.

At wide open throttle, an additional quantity of fuel is supplied by the by-pass metering jet (20).

Accelerating Pump Adjustment.—For complete accelerating pump adjustment information see Accelerating Pump Adjustment under Stromberg Model DX-3 above. The pump adjustment information is the same for both the D single barrel and DD dual carburetors.

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model DD.—Stromberg DD carburetors are practically the same as the Stromberg DX jobs with the exception that the DD types have two barrels and the throttle must be synchronized.

Idling Discharge Jets (Stromberg Model DD).—In each barrel of the carburetor will be found two idling openings. One is located below the throttle valve and the other is located above the throttle valve. The opening below the throttle valve is the small hole and is the slow idling jet while the opening above the throttle valve is the larger hole and is the fast idling jet. Both discharge jets above and below the throttle are fixed openings.

The idling mixture is controlled by means of an idling adjusting screw (3) Fig. 5 which is an air bleed and actually controls the amount of air that passes into the idling tube.

The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely if ever be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idling jet has drilled out the opening.

Diagnosis, Idling Jet too Large.—If the idling jets are too large the motor will Roll and load regardless of how much air is admitted through the idle adjustment. Also the motor will have a tendency to idle fast with the throttle completely closed.

Main Metering Jets (Stromberg Model DD).—On the Stromberg Model DD carburetors, there are two metering jets as shown at (10) Fig. 6. These metering jets control the flow of gasoline for speeds above 25 miles per hour and may be either of the fixed size or adjustable type.

Diagnosis, Metering Jets too Large.—To determine whether the main metering jets are too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 15 miles per hour in high gear can be maintained. If the metering jets are too large a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully opened.

Diagnosis, Metering Jets too Small.—If the main metering jets are too small the car will have a tendency to stall on a slight grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerate gradually to about one-fourth throttle.

The symptoms produced by metering jets of the wrong size may be confused with a by-pass jet of the wrong specifications. If after changing the metering jets to a larger or a smaller size the trouble still exists or is aggravated, the by-pass jet should be checked.

By-Pass Jet (Stromberg Model DD).—The purpose of the by-pass jet is to supply an increased amount of gasoline to the main discharge jets at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet; namely, the

by-pass jet may be too large, the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large.—If the by-pass jet is too large the car owner will probably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 15 miles per hour in high gear can be maintained. If the by-pass jet is too large a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle fully open.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult.

Diagnosis, By-Pass Jet too Small.—If the by-pass jet is too small the car owner may complain of lack of power and speed on heavy pulls accompanied in such instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle, depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor. Or a condition may exist where when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed the motor will pick up. A tendency to poor acceleration will prevail under all conditions.

Main Discharge Jets (Stromberg Model DD).—The main discharge jets on all Stromberg Model DD are not changeable. That is, the main discharge nozzles insofar as specifications are concerned are the same for any particular size of carburetor and under no consideration should these jets be drilled out or changed.

High Speed Air Bleed (Stromberg DD).—The high speed air bleeder on the Stromberg Model DD carburetors are mounted on the end of the main discharge jets as shown at (22) Fig. 5. These air bleeders and the main discharge jets have been calibrated to work in perfect balance at the factory. Therefore, any changes of the air bleeders should be avoided.

Diagnosis, High Speed Air Bleeders too Large.—If the high speed air bleeders are too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, High Speed Air Bleeders too Small.—If the high speed air bleeders are too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speed. In most cases the trouble can be checked out by the same test procedure used for a large metering jet as described above but before making the hill test the car should be tried out under level road conditions.

Accelerating Pump (Stromberg Model DD).—The pump discharge jets (21) Fig. 5 in the illustration for type DD regulate the flow of gasoline from the accelerating pump and affects the operation of the carburetor during quick acceleration only. The accelerating pumps on all models of DD carburetor are controlled by vacuum. Adjustment of the pumps consist of regulating the length of the stroke by means of the screw (6).

Diagnosis, Pump Stroke Too Short.—To check, first try the car on the service floor by accelerating the motor from idle to high speed several times, always dropping back to idle for 10 seconds. A condition may exist where it is difficult to determine whether the pump stroke is long or short. The car may not sputter for several trials but may just hesitate or stumble. The object of the test is to get the carburetor to sputter. If the adjustment is so close that the car will not sputter, then try shortening the stroke until a sputter is obtained. If the trouble is actually caused by a short stroke, shortening the stroke will aggravate the trouble. After the test, if the car is troubled with a short stroke, lengthen out until motor smooths out.

The complaints generally registered by the car owner when the pump stroke is too short are as follows: The carburetor will sputter on acceleration and occasionally may cause the motor to die in traffic after a quick acceleration and deceleration; also the car will probably be troubled with hesitating or stumbling.

If the adjustment is so close that it is necessary to change the length of the pump stroke in order to indicate the trouble and the stroke happens to be long then shortening the stroke for the test should improve the performance. In all cases after adjustment, try the car out on a level road.

Diagnosis, Pump Stroke too Long.—The symptoms of this trouble are as follows: On acceleration motor will probably hesitate, Roll, stumble and jerk, then straighten out and go. After quick acceleration if the car is suddenly dropped back to idle, the motor will Roll for a short time and then probably die from too rich a mixture.

To check for too long a pump stroke, test the car on the service floor. On quick acceleration the motor will stumble then when motor is decelerated to idle, motor will run rich for probably 10 or 15 seconds and may even die. On road test the motor will stumble and hesitate on acceleration and then run rich for 40 or 50 feet.

Venturi Tubes (Stromberg Model DD).—All venturi tubes on Stromberg Model DD carburetors are removable and are held in by a set screw and lock nut. In practice, it is seldom that trouble from a venturi tube of wrong size is experienced. Before testing for wrong venturi size, see that the set screw is tight and that the venturi is tight in the body.

Diagnosis, Venturi too Large.—If the venturi size is too large, motor acceleration may be smooth but slow with lack of power on pull. As the car gains momentum on acceleration the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small the motor will have good power on acceleration at wide open throttle under 25 miles per hour but as the car picks up momentum and the load is lightened with the throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with the throttle wide open the car will lack speed and gasoline mileage will be poor.

Stromberg LS

This carburetor is of the plain tube type so called because having no air valve or metering needle, both the air passage and gasoline jets are

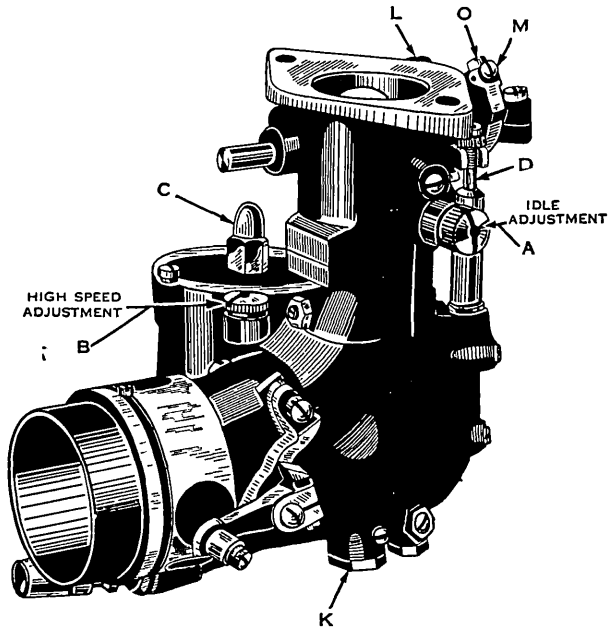


Fig. 7

View of Stromberg Model LS carburetor showing idle adjustment and high speed adjustment. The economizer needle can be seen at (D).

of fixed size for all engine speeds. This model has been especially developed for the use of low grade gasoline fuels and contains the following special features. A gasoline feed above the throttle with separate adjustment for idling the motor. An accelerating well which gives an extra supply of fuel just for a moment as the throttle is opened. An economizer which permits the carburetor to operate on a very lean and economical mixture at the closed throttle position and average driving but automatically shifts to the richer setting when the full power of the motor is called for.

CARBURETOR ADJUSTMENT

Stromberg LS

Idle Adjustment.—The idling mixture on closed throttle running up to about 8 miles per hour are controlled by the upper knurled button (A) Fig. 7. This operates on the air so that screwing it in gives a richer mixture and out, a leaner mixture.

To adjust the carburetor turn screw (A) outward until the motor slows down, then turn in notch by notch until the proper idling mixture is reached. Care should be exercised not to slow down the motor by too rich a mixture by screwing the adjusting screw in too far. When the motor is idling properly, there should be a steady hiss in the carburetor.

If after adjusting the low speed needle as above described the motor idles too fast, turn the small throttle stop screw (M) to the left or counter-clockwise until the proper idling speed is reached. If the motor idles too slow and stops, turn screw (M) to the right or clockwise until proper speed is reached. Before adjusting the throttle stop screw it will be necessary to loosen lock screw (O).

High Speed Adjustment.—The high speed and main driving adjustment is regulated by the high speed needle (B) Fig. 7 which regulates the opening through which the fuel flows to the main jet. Turning (B) to the left counter-clockwise gives more gasoline and to the right, clockwise, less gasoline.

To make the proper high speed adjustment, advance the spark lever to normal driving position; set throttle lever on steering wheel at position which will give about 25 miles an hour speed on a smooth road, then adjust the high speed needle to the minimum opening that will give the greatest engine speed for that throttle opening. This should give a good average adjustment. Two or three notches less should give best economy for continuous driving or touring and two or three notches to the left may be best for short turn runs in cold weather when the motor does not get up to normal heat.

To prevent a wrong high speed adjustment from giving a harmful rich mixture, a gasoline nozzle reducer is inserted beyond the high speed needle opening in the base of the discharge jet above the plug (K). The reducer placed in the carburetor at the factory will permit about 20% more gas to pass through than is generally needed. However, under some conditions a larger reducer may be needed in order to secure a richer mixture. These reducers can be obtained from the Stromberg factory or the nearest Stromberg service station.

Economizer Device.—The economizer device (D) operates to automatically lean out the mixture at speeds from 10 to 45 miles per hour. The economizer needle is properly set at the time the carburetor is installed on the motor and no adjustment is needed.

In all cases carburetor adjustments should be made when the motometer shows a temperature of higher than 140° and the richer adjustment necessary for a cold motor should be obtained by using the driving control or choker.

Stromberg M

The Model M carburetor is a simplified form intended for heavy duty service. To reduce the number of fuel passages the emulsion column for the air bleed jet is made concentric with the idling tube and the fuel emulsion passes through a horizontal drilled hole to a groove around a small venturi into which it discharges to a number of small holes. (See Fig. 8D). No air bleeds are used in the idling tube while the idle discharge jet instead of being slotted as in the Model O has a recessed round orifice.

The accelerating well is controlled by the suction in the small venturi tube as illustrated in

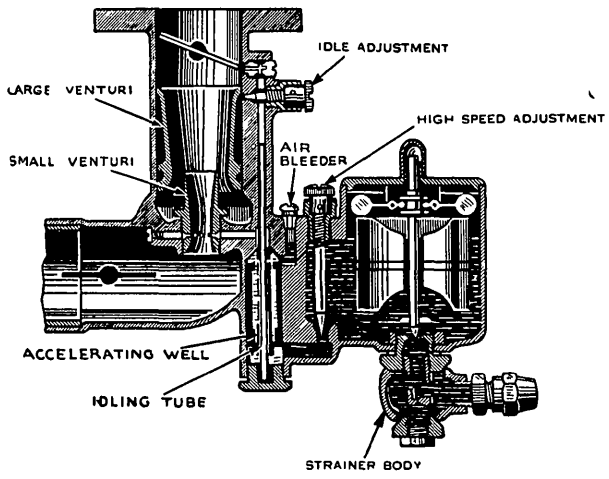


Fig. 8

Cross sectional view of Stromberg Model M carburetor designed for truck service. This carburetor has a large and a small venturi and idle adjustment, a high speed adjustment and a manometer type of accelerating device.

Fig. 8A. The principle is simply that of a U type manometer or water gauge. If the right hand channel is opened to atmospheric pressure and the left one opened to suction, the level of the liquid in the right hand channel will rise and fall according to variations of the suction existing in the venturi tube. When the throttle of the carburetor is opened to increase the speed of the engine the suction on the left hand passage increases and the level falls in the right hand side, the fuel so displaced will go into the left hand channel and add to the amount passing through from the metering orifice, thereby giving temporarily rich charge.

In the carburetor as built, the accelerating supply chamber case, open to atmosphere, is made concentric with the emulsion channel and communication between the two is made through a series of small holes. (See Fig. 8B). The delivery of the accelerating charge can be controlled and graduated by the size of these holes according to the extent to which they balance the suction in the accelerating supply chamber and emulsion channels.

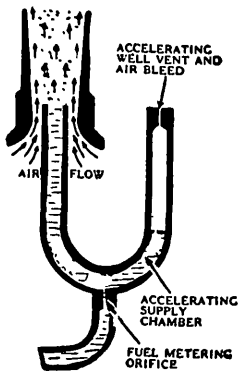


Fig. 8A

Simple U tube form of accelerating well used on Stromberg carburetors. Note that the air bleed action cannot begin until contents of U tube have been emptied; that is, air bleed action and accelerating well action cannot both be present at the same time.

Compensating Accelerating Well.—The compensating well differs from the single well in having its air bleeder limited by the holes (B) Fig. 8C in the neck so that a very large size (#40) air bleeder plug is used serving as a dust protector. The rate of the well discharge is governed by the size of the hole (A) in the top end, a large one giving more gas on low speed acceleration. For average use best results are usually obtained with the "X" well with the hole (A) size No. 67. Hole (A) should never be larger than No. 60 nor smaller than No. 70. Where less gasoline is needed for low speed acceleration, "Z" well may be used with (A) hole size #67 or #70.

In the M-1, 2 and 3 carburetors, the wells corresponding to the well "X" in the above paragraph

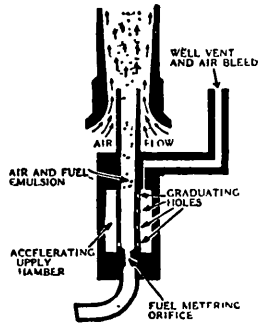


Fig. 8B

Refined and improved form of accelerating well used on Stromberg carburetors combining both air bleed and accelerating well action in one structure.

are designated as "S" and "N" in the following table. The wells corresponding to the well "Z" are designated as "U" and "M".

Carburetor Models			
	MB-1 MB-2	M-1 M-2	M-3
Wells	X Z	S U	N M

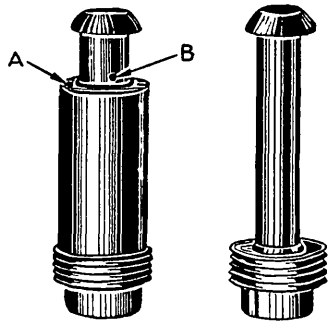


Fig. 8C

The left view shows the compensating accelerating well for Model M carburetors. The right view shows the single accelerating well for Model M carburetors.

In some of the M carburetors the emulsion passage above the acceleration well is carried up to communicate through a cross drill with holes in the throat of the large venturi so that the fuel discharge really is metered under an average between the small and large venturi suctions, which gives a slightly leaner intermediate mixture range than if the fuel is metered only by the small venturi suction.

Single Accelerating Well.—This well differs from the compensating well in that it has a greater capacity and also in that its effect is confined to

low speeds; that is, it is entirely empty at a comparatively low throttle position and is thus more violent in its action than the other type.

For commercial vehicles and trucks, this type of well is recommended with holes in the sides (beginning at the top) No. 60-58-57-57. This single accelerating well is shown in the right hand view of Fig. 8C. When more gasoline is needed for low speed acceleration, these same parts may be used with holes No. 65-60-58. Using smaller or fewer holes in the sides gives more discharge on low speed accelerations but empties the well sooner so that it has less action at higher speeds. The same effect as using smaller holes may be obtained by increasing the size of the air bleeder, thus, as a general tendency, a larger bleeder will give a stronger low speed acceleration; a smaller one, stronger high speed acceleration.

CARBURETOR ADJUSTMENT

Stromberg M

Idle Adjustment.—The idle mixture and low speed closed throttle running are controlled by the upper knurled button or idle adjusting screw, Fig. 8 This operates on air so that screwing it in gives a richer mixture and out a leaner mixture.

Turn screw outward until the motor slows down, then turn inward notch by notch until the proper idling mixture is reached. When the motor is idling properly there should be a steady hiss in the carburetor.

Turn screw outward until the motor slows described the motor idles too fast, readjust to the proper idling speed by turning the throttle stop screw either in or out as the case may be.

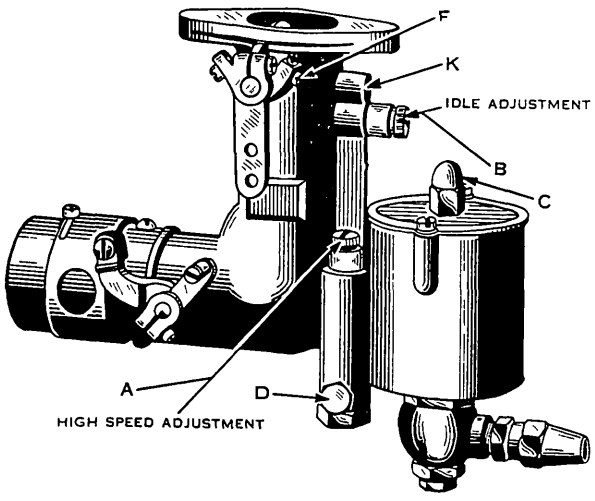


Fig. 8D

View of Stromberg Model M carburetor showing high and low speed adjustments In this carburetor the emulsion column for the air bleed jets is made concentric with the idling tube and the fuel emulsion passes through a horizontal drilled passage to a groove around the small venturi into which it discharges through a number of small holes.

High Speed Adjustment.—The high speed and main driving adjustment is regulated by the high speed needle (A) Fig. 8D which regulates the opening through which the fuel flows to the main jet. Turning (A) to the left (counter-clockwise) gives more gasoline and to the right (clockwise) less gasoline.

To make the proper high speed adjustment, advance the spark lever to normal driving position. Set the throttle lever on the steering wheel at a position which will give about 25 miles an hour speed on a smooth road—on trucks throttle should be one-fourth open—then adjust the high speed needle to the minimum opening that will give the greatest engine speed for that throttle opening. This should give a good average adjustment for continuous driving or touring. Several notches to the left may be best for short runs in cold weather when the motor does not get up to normal heat.

To prevent a wrong high speed adjustment from giving a harmful rich mixture, a gasoline nozzle reducer is inserted beyond the high speed needle opening inside the plug (D). The reducer placed in the carburetor at the factory will permit about 20% more gas to pass through than is generally needed. However, under some conditions a larger reducer may be needed in order to secure a richer mixture. These reducers can be obtained from the Stromberg factory or the nearest Stromberg service station.

In all cases, carburetor adjustments should be made when the motor is up to a temperature higher than 140° and the richer adjustment necessary for a cold motor should be obtained by using the driving control or choker.

Stromberg O and T

This series of carburetors is characterized by the double venturi, a main discharge jet located in the center of the small venturi, the air bleed economizer and the manometer type of accelerating well. The carburetor bodies of the O series are of brass and sand cast. The Model T series are similar in general construction to the Model O but are die cast. They carry a needle warming up control and a different form of float mechanism from the Model O series. When the new Stromberg Vis-a-Gas strainer is incorporated in the float chamber cover of these models, they are designated as TV or TXV.

The Model OT is similar to the OE but cast in brass with special heavy construction to render it suitable for truck and motorbus service. It carries a special heavy duty float mechanism. This model is made in 1¼", 1½" and 1¾" sizes. The 1½" being unusual in that the throttle shaft is parallel with the center line of the flange holes which flange holes are in line with the air entrance of the float chamber in all the OT models.

On the Models OE, OA, OS and some others, the strainer chamber is cast in one piece with the

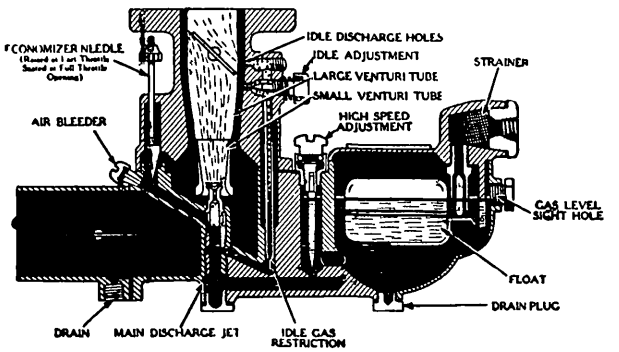


Fig. 9

Cross section diagrammatic view of Stromberg Model T carburetor showing economizer needle, high speed air bleed and idle adjustment arrangement.

bottom of the carburetor while the float needle valve seat is screwed in from the top. The strainer is then held in by a nut screwed in from the bottom. (See Fig. 10).

The float mechanism of the Model T carburetor Fig. 9, is of a slightly different type, copied from the very successful ones used in the Stromberg airplane carburetors. In this the float is pivoted at the side from an arm projecting downward from the float chamber cover, while the gasoline enters from the top. Readjustment may be made by bending the lever arm in the corner between where it touches the float needle and where it meets the float body. If the level is low, bend arm so as to move float upward toward the float chamber cover, the same distance as the level needs correction; that is, to raise the level 1/16″ bend the float up 1/16″. To lower the level, hold the float arm tight where it touches the needle and bend the float downward away from the float chamber cover.

Main Discharge Jet.—After passing the adjustment orifices, the gasoline flows to the central main discharge jet, which may have a single central nozzle opening or four diagonal nozzle holes in a "rose" type head. The jet has a number of holes in its side between the thread and the shoulder on which it seats, which admit the air bleed to the central emulsion channel. At low idling the outer space around the jet is filled with gasoline standing over these holes and serves as a reservoir from which either the idling system or main jet system can draw during quick changes in suction or throttle position. At the lower part of the jet are located idle feed holes which register with the cross drill to the idling tube and idle system.

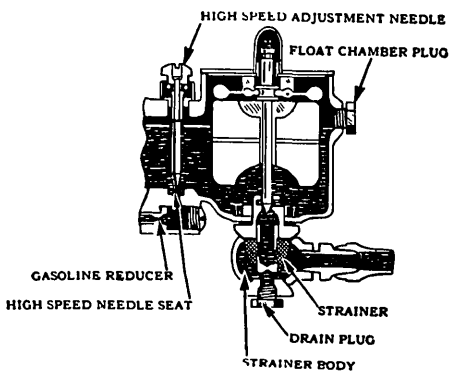


Fig. 10

Cross section view showing bowl assembly used on Stromberg Model O carburetors.

The Air Bleed.—The high speed air bleed at wide open throttle is regulated by the size of the opening through the point of the economizer needle valve for the Model O series, or through a separate air bleeder for the Model T series. A diagrammatic illustration of the air bleed system showing the point of the needle drilled at (A) is shown in Fig. 11 while the separate air bleed as used on the Model T series is shown in Fig. 9. On these models the economizer needle is blank.

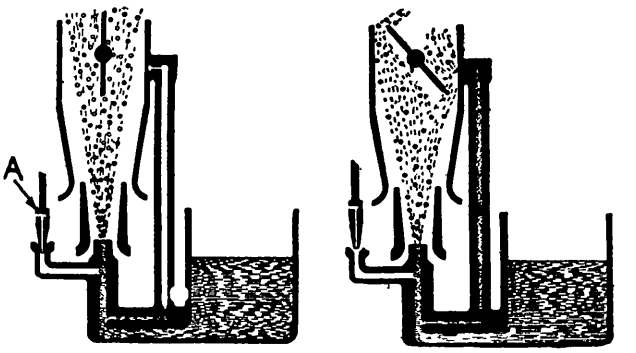


Fig. 11

Diagrammatic view of Stromberg carburetor showing air bleed and economizer Note that the economizer needle is drilled with a small bleed hole which operates when the needle is seated. The right view shows the economizer needle raised giving a large air bleed opening and a lean mixture during part throttle driving. The left view shows the throttle wide open, the economizer needle seated with a small air bleed to give the desired richer mixture at maximum power.

When the economizer needle valve does not seat securely this will give the effect of a considerably larger high speed bleeder and require more than customary opening of the high speed gasoline adjustment at all speeds.

The amount of economizer action or change in the mixture depends upon the difference in the air bleed opening with the needle raised and seated; and this is controlled in making a setting by restriction of the air bleed passage by means of an economizer reducer plug screwed into the passage leading from below the economizer needle to the main discharge jet. A gasoline reducer is shown in Fig. 10. When the economizer reducer is No. 52 or smaller, there will be practically no economizer action. When the economizer reducer is made as large as the main discharge jet tip opening, which is the maximum size that should be used, this should give the full economizer range possible.

CARBURETOR ADJUSTMENT

Stromberg Model O

The adjustment information for all Stromberg Model O series of carburetors is practically the same. Before attempting a carburetor adjustment, all other adjustments should be properly made such as ignition timing, spark plug and contact point setting and the motor should be thoroughly warmed up.

Idle Adjustment.—The idling mixture and closed throttle running up to about 8 miles per hour are controlled by the knurled button or idle adjusting screw (A) Fig. 12. This operates on air so that screwing it in clockwise gives a richer mixture and outward a leaner mixture.

When the engine is idling properly, there should be a steady hiss in the carburetor. If after adjusting the low speed needle as above described the engine idles too fast, turn the small throttle stop screw to the right or the left as the case may be until the proper idling speed is reached.

High Speed Adjustment.—The high speed and main driving adjustments are regulated by the high speed needle (B) Fig. 12. Turning this needle down (clockwise) gives less gasoline and up (counter-clockwise) more gasoline.

To obtain a correct adjustment, advance the spark lever to normal driving condition, set the throttle lever on the steering wheel to a position which will give about 20 miles per hour road speed on a smooth road, then adjust the high speed needle to the minimum opening that will give smooth running and the maximum engine speed for that throttle opening. This should give a good average adjustment. Several notches less opening may give best economy for continuous driving or touring and one notch more may be best for short runs in cold weather, when the engine does not get up to normal heat.

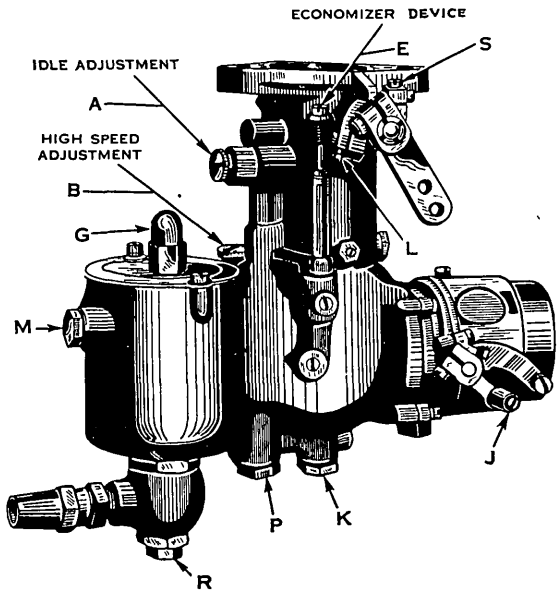


Fig. 12

View of Stromberg Model O carburetor showing the location of the idle adjustment, high speed adjustment and economizer device.

Economizer Device.—The economizer device (E) operates to automatically lean out the mixture at speeds from 10 to 25 miles per hour. The economizer needle is properly set at the time the carburetor is installed on the engine and no adjustment is needed.

In all cases carburetor adjustments should be made when the engine temperature is higher than 140° and the richer adjustment necessary for a cold engine should be obtained by using the driving control.

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model O.—There are six points at which the internal adjustments of a Stromberg Model O carburetor may be changed to affect its operation. These points will be considered in their proper order in the following paragraphs.

While the external carburetor design for all Model O types used on the different models of Chrysler automobiles may be slightly changed the principle of operation and internal parts for all types are practically the same.

Idling Discharge Jets (Stromberg Model O).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with the idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idle jets has drilled out the openings.

Diagnosis, Idle Jets too Large.—If the idling jets Fig. 13 are too large the motor will Roll and load regardless of how much air is admitted through the idle adjustment; also the motor will have a tendency to idle fast with the throttle completely closed.

High Speed Adjustment (Stromberg Model O).—The high speed adjustment will take care of all ranges within the limit of performance of the carburetor. Very little trouble will be experienced with high speed adjustment from any cause other than wear.

Diagnosis, High Speed Adjustment Parts Worn.—Wearing of the high speed adjusting needle and socket will cause a variation or irregular running of the motor at speeds above 20 miles per hour. A loss in gasoline mileage may also be noticed.

To check for worn parts turn the adjustment back and forth and if a looseness can be felt the parts are worn and should be replaced. See information under adjustment in the Adjustment Section.

Accelerating Well Bleeder and Discharge Jet (Stromberg Model O).—If all carburetor adjustments have been correctly made and a noticeable flat spot still exists on quick acceleration the trouble may be due to an accelerating well bleeder or discharge jet of wrong size.

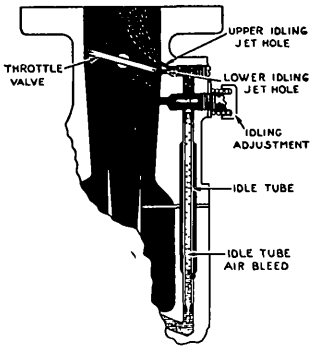


Fig 13

Sectional view of Stromberg Model O showing how the fuel feed through the idling system is increased by passage of the throttle edge across the lower discharge opening

Diagnosis, Well Bleed too Large —A well bleeder (A) Fig 14 that is too large can be indicated by testing the car under quick acceleration on a level road When the throttle is first opened the car will accelerate with good power for a short distance and then suddenly hesitate and may backfire

Diagnosis, Well Bleeder too Small —To determine whether the accelerating well bleeder is too small, test the car under quick acceleration on a level road In the first stages of acceleration the motor will have good power but as the car approaches the desired speed a tendency to load will be noticed

Diagnosis, Accelerating Well Discharge Jet too Large or too Small —If the accelerating well discharge jet (B) Fig 14 is too small the motor will hesitate and backfire on the first stages of acceleration

If the accelerating well discharge jet is too large the motor will load from a rich mixture through the full range of acceleration providing the accelerating well bleeder is small enough to keep up the gasoline supply in the accelerating well However, if the accelerating well bleeder is of such size that the fuel is low in the well the mixture will be rich on the first stages of acceleration dropping off to a lean mixture after a short period of wide open throttle

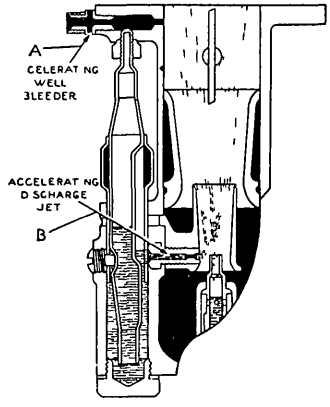


Fig 14

Sectional view of Stromberg Model O showing accelerating well and bleeder Note that the bleeder has two sizes of bleed holes for adjustment purposes

Economizer Needle (Stromberg Model O) —This needle will seldom give trouble unless someone has tampered with it

Diagnosis, Needle Lift too High —If needle lift is too high the motor will have a tendency to run rough and may sputter in the carburetor at speeds above 40 miles per hour See Fig 15

Diagnosis, Needle Lift too Low —If the needle lift is too low a condition of poor fuel economy will result. The average needle lift setting is 5/16"

Main Discharge Jet (Stromberg Model O) —It is seldom in actual practice that a large main discharge jet will have any effect on car performance other than to lower the gasoline mileage If car performance is good and the gasoline mileage is low then a smaller discharge jet may be tried

Diagnosis, Main Discharge Jet too Small —If the main discharge jet, Figs 16 and 17, is too small the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull

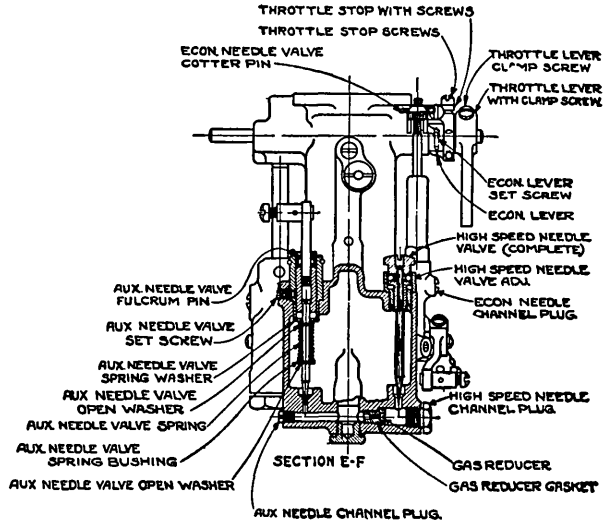

THROTTLE STOP WITH SCREWS
THROTTLE STOP SCREWS
ECON NEEDLE VALVE COTTER PIN
THROTTLE LEVER CLAMP SCREW
THROTTLE LEVER WITH CLAMP SCREW
ECON LEVER SET SCREW
ECON LEVER
HIGH SPEED NEEDLE VALVE (COMPLETE)
HIGH SPEED NEEDLE VALVE ADJ
AUX NEEDLE VALVE FULCRUM PIN
ECON NEEDLE CHANNEL PLUG
AUX NEEDLE VALVE SET SCREW
AUX NEEDLE VALVE SPRING WASHER
AUX NEEDLE VALVE OPEN WASHER
HIGH SPEED NEEDLE CHANNEL PLUG
AUX NEEDLE VALVE SPRING
AUX NEEDLE VALVE SPRING BUSHING
SECTION E-F
GAS REDUCER
AUX NEEDLE VALVE OPEN WASHER
GAS REDUCER GASKET
AUX NEEDLE CHANNEL PLUG

Fig 15

Sectional view of Stromberg carburetor showing the auxiliary needle valve assembly for starting This valve is for the purpose of admitting a larger flow of gasoline to the main discharge jet when the motor is cold and the choke is in operation

Economizer Needle Air Bleed (Stromberg Model O) —The economizer needle air bleed and main discharge jet have been calibrated at the factory to work in perfect balance Therefore, any changes of the air bleeder should be avoided

Diagnosis, Economizer Needle Air Bleeder too Large —If the air bleeder is too large the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration Sometimes at extreme high speed a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on

Diagnosis, Economizer Needle Air Bleeder too Small —If the air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark The motor will be logy on acceleration and at road speeds

In most cases the trouble can be checked out by the same test procedure used for a large metering jet The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained If the air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by car passing over the brow of the hill with the throttle still fully open

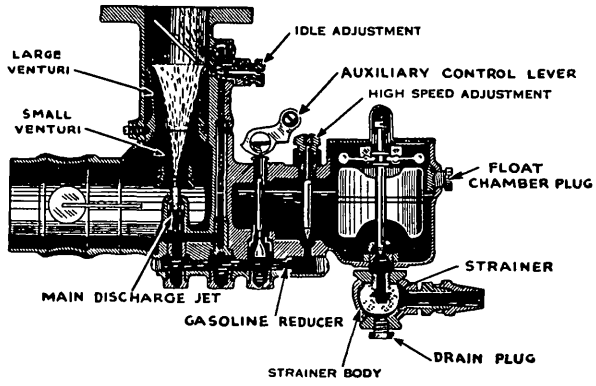


Fig. 16

Cross section diagrammatic view of Stromberg Model O carburetor showing location of idle adjustment, high speed adjustment and auxiliary control lever for starting. The auxiliary control lever is for the purpose of supplying more fuel to the main discharge jet for starting purposes only, and should be closed as soon as the motor is warmed up.

Venturi Tubes (Stromberg Model O).—On all Model O Stromberg carburetors the venturi tubes are removable units and are held into the carburetor body by a set screw and lock nut.

In practice it is seldom that trouble from a venturi of wrong size is experienced. However, if this trouble is encountered, a check to see that the venturi is tight in the carburetor body should be made before testing for wrong size.

Diagnosis, Venturi too Large —If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened, with throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

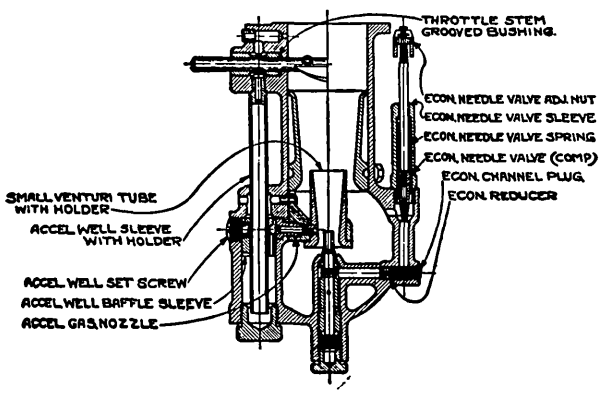


Fig. 17

Cross sectional view of Stromberg carburetor showing the accelerating well assembly and economizer needle. The amount of economizer action with the economizer needle closed is controlled by the economizer reducer as shown.

Stromberg T

The Stromberg Model T series of carburetors is very similar to the Model O type with the exception of a slightly different float construction and are different in the economizer air bleed. On the T type carburetors the air bleed is a separate opening and the economized needle is blank while on the O type of carburetors the economizer needle is drilled.

CARBURETOR ADJUSTMENT

Stromberg T

Seasonal Adjustment.—The carburetor should carry the correct adjustment when delivered from the factory but slight modifications of these adjustments may be necessary under climatic change. On the approach of winter at an atmospheric temperature of 40° F. or below, the high speed needle adjustment (B) Fig. 18 may be unscrewed counterclockwise about two notches or one-eighth of a turn. Also, the accelerating well bleeder (D) should be taken out and turned around so that the end carrying the small hole is screwed into the carburetor (after taking off and changing over the round cap which protects the screw threads at the outer end). When the weather changes from cold to warm in the spring, these changes should be reversed. The high speed adjustment may then be screwed down clockwise two notches and the end of the accelerating well bleeder which carries the larger hole screwed into the carburetor.

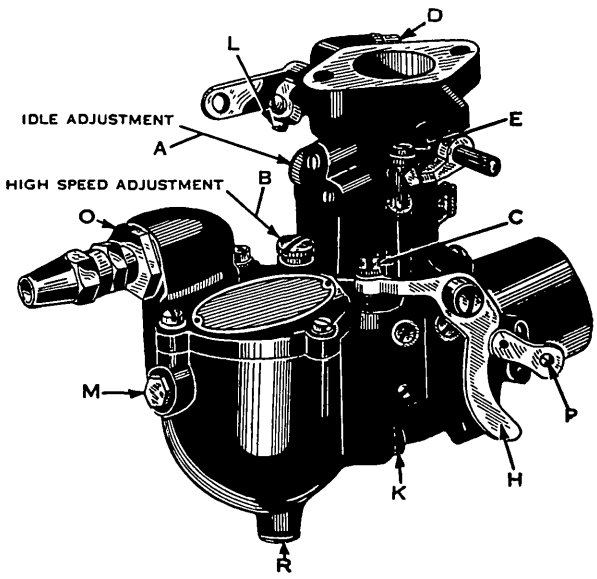


Fig 18

View of Stromberg Model T carburetor showing the location of the idle adjustment, high speed adjustment and the auxiliary starting needle (C). The location of the economizer needle (E) is also shown This carburetor is equipped with an accelerating well using a double ended bleeder as shown at (D).

If the adjustment of the carburetor has been tampered with, it may be restored as follows: Have the engine well warmed up so that the intake pipe above the carburetor is at least warm to the hand. Be sure that the choke valve is wide open and the auxiliary control needle (C) is tightened down on its seat so that the auxiliary control lever (H) has a slight amount of play. Make high speed adjustment first but be sure at this time that the low speed adjustment (A) is at least one turn off its seat.

High Speed Adjustment.—To adjust for high speed, set the spark lever in full advance position (if car has a spark advance lever): Set throttle lever on steering wheel to a position which will give about 20 miles per hour road speed on a level road then turn the high speed adjustment (B) clockwise which gives less fuel to the main jet until the engine begins to slow down, then slowly turn the screw counter-clockwise until the maximum engine speed is reached for that throttle position. This should give a good average adjustment. Several notches less opening may give best economy for continuous driving or touring and a few notches more may be best for short runs in cold weather when the engine does not get to normal heat.

Low Speed Adjustment.—To adjust for low speed after the high speed adjustment has been made, slow the engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached; then turn the low speed adjustment (A) Fig. 18 gradually right or left until steadiest running and fastest running for that throttle position is obtained. This adjustment works on air so that screwing it in gives a richer mixture and out a leaner mixture. If after this adjustment is made the engine idles too fast, readjust to the desired speed by means of the throttle stop (L). When the engine is idling properly, there should be a stead hiss in the carburetor.

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model T.—All Model T carburetors are practically the same as Model O with the exception of the float bowl assembly design and the high speed air bleed, but all specifications as to principle of operation and jet diagnosis are the same as the Model O.

High Speed Air Bleeder (Stromberg Model T).—The difference between the air bleed arrangement on Stromberg Model T and O is that the O type has the air bleed needle drilled. The T type has a separate air bleed and the needle is blank. The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance. Therefore, any changes of the air bleeders should be avoided.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speed a gentle popping in the muffler will be produced similar to the exhaust noise when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on.

Diagnosis, Air Bleeder too Small.—If the high speed air bleeder is too small the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speed.

In most cases the trouble can be indicated by the same test procedure used to determine whether a main metering jet is too large. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the air bleed is too small a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available suitable for test, the car may be tried out on a level road as follows: First, replace the air bleeder with a larger size (not to exceed four sizes larger on the first test); it should be remembered, however, that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passageway is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved but if no change is noticed or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Stromberg 00-2

The Model 00 carburetor is made in the 1¼" size only and follows the construction of the Model T series carburetors as to the float mechanism, venturis and jets. It has a single high speed needle adjustment which regulates a fuel orifice in series with two metering jets each of which feeds one barrel of the main discharge jet. The idling adjustments which are individual for each barrel are different from that of other models in that they employ needles regulating the upper idle discharge hole, the one at all times above the throttle valve and thereby regulates the mixture from the minimum idling speed up to about 10 miles per hour, while the mixture from 10 to 18 miles per hour is regulated by the size of the fuel and air bleeder orifices in the idling tube. This construction allows a very close adjustment on the idles as has been found necessary with dual carburetors. A single accelerating well is used with individual outlets to the small venturi of each barrel. The accelerating well is usually fitted with a thermostat control.

CARBURETOR ADJUSTMENT

Stromberg 00-2

High Speed Adjustment.—The high speed adjustment (B) Fig. 19 is the lower and vertical one and controls the fuel feed to both barrels of the carburetor. To readjust, advance the spark and open the throttle to a position that will give at least 30 miles per hour road speed on a level road.

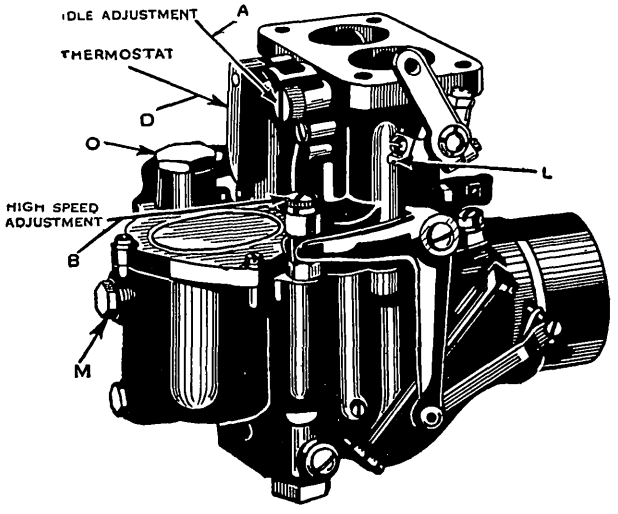


Fig. 19

View of Stromberg OO-2 carburetor showing the location of the idle adjustment, high speed adjustment and thermostat. As shown in the illustration, the high speed needle is also used for an auxiliary starting needle and economizer When the choke is closed, the control lever lifts the high speed adjusting needle off its seat, thus supplying more gasoline to the main jet for starting. The accelerating well is controlled thermostatically as shown at (D).

Be sure that the choke button on the dash is all the way down since closing the choke raises the high speed needle. Cut down the fuel feed by screwing the adjustment clockwise until the engine begins to lose speed then unscrew counter-clockwise until absolute maximum engine speed is obtained for that throttle position. If the adjustment is too lean, the engines will warm up slowly and not show normal power. If the adjustment is made at too low an engine speed and too small a throttle opening, it will be found easy to make a mistake and get the mixture too lean. Care should be exercised to have the throttle properly set and the engine running at the correct speed as described above.

Idle Adjustment.—The idle adjustments (A) Fig. 19 are the two horizontal upper knurled screws. These screws control the idling gasoline feed so that screwing them in gives less fuel and outward, more fuel. Ordinarily they will need to be only one-fourth turn to one full turn off the seat. A description with a cut illustrating the idling system for this carburetor will be found in the Carburetor Specification Diagnosis section below. To readjust with the engine warm, carefully set the throttle stop screw (L) to give the lowest idling speed desired then vary the position of each idling adjustment in turn until smoothest idling is obtained. The spark lever on the steering wheel may be all the way or half retarded. It will be found that the action of the throttle stop screw is quite delicate for the reason that the engine can get enough air to idle from two throttles with a very small opening. It may therefore, be necessary to set up the throttle stop screw to compensate for wear on its end after the car has been used a month or so.

Thermostat.—In the past it has been found that any accelerating well adjustment made for good winter operation may give bad flat spots in the summer time from too much gasoline in the accelerating charge, whereas if the accelerating charge is cut down in summer to the amount necessary with the high temperature then existing under the hood, the acceleration may be poor in the winter time and the car hard to warm up and drive. The thermostat controlled device gives the correct amount of accelerating charge both winter and summer and thereby smooth operation at all speeds. These thermostats are put up in a self contained unit Fig. 20 with self locking steel cover and are not intended to be repaired except at the Stromberg factory. With proper high speed adjustment the engine should respond properly to the throttle any time that it has been warmed up enough to pull suddenly against the brakes at 6 miles per hour with the throttle wide open.

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model 00-2.—The specification diagnosis information for Stromberg OO series of carburetors is very similar to that for Stromberg Model O. The difference lies mainly in the fact that the Stromberg Model OO job has two barrels while the Stromberg O has only one barrel.

Idling Discharge Jet (Stromberg Model OO-2.—In each barrel of the carburetor will be found two idling openings; one is located below the throttle valve and the other is located above the throttle valve and is shown at (D) and (E) in Fig. 21. The opening below the throttle valve is a set opening and the gasoline and air mixture that passes through this opening is regulated by an air bleed hole (C) which is located just below the idling

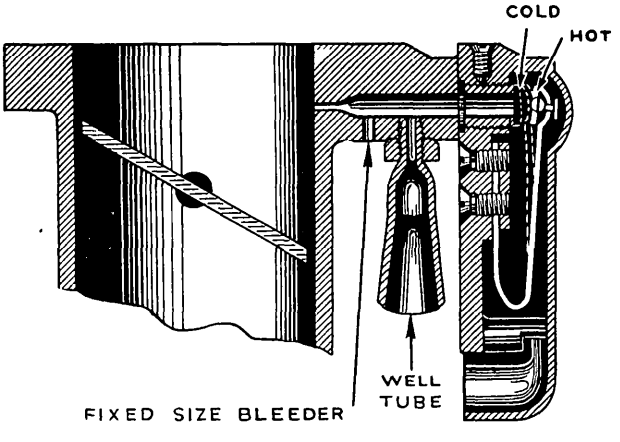


Fig. 20

Cross sectional view of thermostat controlled units used on Stromberg OO-2 for the purpose of regulating the accelerating well for different temperature conditions. These units are enclosed in a metal case and are not intended to be repaired If the unit should give trouble, replace with a new one.

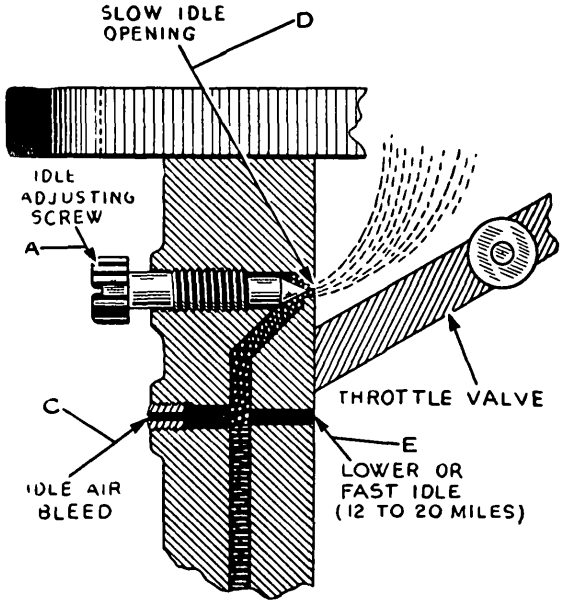


Fig. 21

Showing a diagrammatic cross section view of the idling opening, idle air bleeder and idle adjusting screw used on Stromberg OO-2 carburetors.

adjustment knurled nut (A). This air bleed hole will usually be found to be a No. 55 drill hole but may be a No. 60 hole since the standard recommended factory setting is a No. 60 drilled hole. The correct setting for any particular car equipped with Stromberg OO-2 carburetor may be found in the specification table in the car section for the particular car in question.

The idle discharge opening in each barrel located above the throttle is also a fixed opening but is controlled by means of the idling adjustment screw (A) Fig. 21. The idling adjusting screw is not an air bleed control but actually controls the amount of fuel that passes through the upper idling opening.

As described above the knurled idling screw takes care of the motor at slow idling speed with the throttle closed. The idling opening (E) below the throttle takes care of the car at speeds of from 10 to 18 miles per hour. While the idle air bleed (C) below the adjusting screw is of the fixed size, it will be found that in some cases persons unfamiliar with this type of carburetor may have either soldered up this hole and drilled it out smaller or drilled the original hole larger.

When conducting tests to determine whether or not the idling opening has been tampered with, it should be borne in mind that there is a slot at the top of the partition between the two barrels of the carburetor allowing fuel from one barrel to communicate with fuel in the other barrel. This slot is for the purpose of balancing the vacuum for the accelerating well bleeders; therefore, when making any tests, care should be exercised to see that the idling adjustment screw for each barrel of the carburetor stands at approximately the same distance off their seats. For example, if the mixture is thought to be lean due to a large air bleed hole and one idle screw is open one-eighth of a turn the other idle screw should be open the same amount, otherwise a condition of unbalance between the banks of cylinders may be obtained which will give a false indication.

Diagnosis, Idle Air Bleeder too Large.—If the idle air bleed hole below the adjusting screw is too large, the mixture will be leaned out for speeds from approximately 10 to 18 miles per hour. The effect of this lean mixture on motor performance will be noticed in proportion to the amount that the idle air bleed hole has been drilled out. A condition of leanness may be reached whereby the motor will hesitate with a tendency to stumble and in some cases may sputter on slow acceleration from 12 to 20 miles per hour.

To determine whether the idle air bleed hole is too large, adjust the low idling screw to a point of where the motor idles properly at slow speed with the throttle valve completely closed. Crack the throttle to a point of where the motor will run at approximately 15 miles per hour. In cracking the throttle, advance the throttle lever very slowly on the quadrant so that the motor will accelerate slowly up to 15 miles per hour. If the idle air bleed is too large, the motor will have a decided flat spot and if the throttle is left at a point where the motor runs at approximately 15 miles per hour for a short time, a tendency to stumble and run rough will be noticed. Continuing with the check, leave the throttle in this position with the motor running as described and open the idle adjusting screw. As the idle adjusting screw is opened, if the idle air bleed is too large, the motor performance should smooth out and the motor run smoothly.

Diagnosis, Idle Air Bleeder too Small.—If the idle air bleeder hole is too small, the motor will have a tendency to Roll and load from a rich mixture at from 10 to 18 miles per hour. To test for this condition, place the spark lever in a half advanced position. Open the throttle valve very slowly to a point where the motor will run at approximately 15 miles per hour. With the throttle set at this point, the car will have a tendency to stumble or hesitate when driven on the road.

When making the test on the service floor, adjust the motor to the correct idling speed with the throttle completely closed. Crack the throttle very slowly with the spark half retarded to a point where the motor will run at approximately 15 miles per hour. If the idle air bleed hole is too small the motor will have a tendency to Roll and run rich. Next screw the idle adjustment screw in, leaning up the mixture. This procedure should have a tendency to smooth the motor performance out and cause the motor to run properly at speeds from 10 to 18 miles per hour.

High Speed Adjustment.—The high speed adjustment will take care of all ranges within the limits of performance of the carburetor. Very little trouble will be experienced with high speed adjustment from any source other than wear.

Diagnosis, High Speed Adjustment Parts Worn (Stromberg Model 00-2).—Wearing of the high speed adjusting needle and socket will cause a variation or irregular running of the motor at speeds above 20 miles per hour. A loss in gasoline mileage may also be noticed.

To check for worn parts, turn the adjusting screw back and forth and if a looseness can be felt, the parts are worn and should be replaced.

Accelerating Well Bleeder and Discharge Jets (Stromberg Model 00-2).—The accelerating well bleeder on Stromberg Model 00-2 is controlled thermostatically. Very little trouble will be experienced with this device other than to clean it at

intervals exercising extreme care not to damage the units in any way. If the thermostat control is found to be defective, it should be replaced with a new unit. For more complete information see information under heading Thermostat in the Adjustment Section for Stromberg Model 00.

Economizer Needle (Stromberg Model 00-2).—The high speed needle (B) Fig. 19 on Stromberg Model 00-2 carburetor serves also as an economizer needle which is operated by an actuating lever which is connected to the choke valve. If the car owner complains of low gasoline mileage, check to see that the needle lift lever is not sticking in such a position that it holds the high speed adjustment open. The economizer lever should always be in such a position that it is free under the seat of the high speed needle valve adjusting screw at all times when the choke valve is in the fully open position. The only time that the economizer needle or lever is used is during the period of choke when the car is cold and the motor is being warmed up.

Main Discharge Jets (Stromberg Model 00-2).—There are two main discharge jets used in the Model 00-2 carburetors. The symptoms of performance are practically the same as for the single barrel Model O. It is seldom in actual practice that a large main discharge jet will have any effect on car performance other than to lower the gasoline mileage. If car performance is good and gasoline mileage is low, then a smaller main discharge jet may be tried. If the main discharge jet in one barrel of the carburetor is changed it should also be changed in the other barrel to the same size.

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet is too small, the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

High Speed Air Bleeders (Stromberg Model 00-2).—On the Stromberg Model 00-2 carburetors there are two high speed air bleeders. These air bleeders have been calibrated at the factory to work in perfect balance with the main discharge jet, therefore any changes of the air bleeders should be avoided as far as possible.

Diagnosis, High Speed Air Bleeder too Large.—If the high speed air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on. If the high speed air bleeder is found to be too large, correct with a smaller bleeder.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

In most cases the trouble can be checked out by the same test procedure used for a large main metering jet. Try the car out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour can be maintained. If the high speed air bleeder is too small a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Venturi Tubes.—There are two venturi tubes used in Stromberg Model 00-2 carburetors. Each venturi tube is locked in the carburetor body by means of a set screw and lock nut. In practice it is seldom that trouble from a venturi of wrong size is experienced. However, this condition could be possible by someone unfamiliar with Stromberg carburetors installing venturis of the wrong size. Before testing for wrong venturi size, see that the set screw that holds the venturi into position is tight.

Diagnosis, Venturi too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speed the carburetor operation may be thoroughly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with the throttle wide open, the car will lack speed and gasoline mileage will be poor.

Stromberg Model R

This carburetor is of the plain tube type so called because having no air valve or metering needle, both the air passages and fuel jets are of the fixed size for all engine speeds. The construction is such that the proper mixture is supplied for all speeds by means of a high and low speed adjustment, an accelerating well is provided which furnishes fuel for quick acceleration and as is shown in Fig. 22 when the choke valve is closed, it automatically actuates a lever which lifts the high speed adjusting needle (B) thus providing a richer mixture for starting and warming up conditions. Also, a cam on the end of the throttle shaft operates against the economizer lever to furnish more fuel at high speeds.

CARBURETOR ADJUSTMENT

Stromberg R

High Speed Adjustment.—The high speed or main driving adjustment is regulated by the high speed needle (B) Fig. 22. Turning this needle down (clockwise) gives less fuel; up, counterclockwise, more fuel.

To obtain an exact adjustment, advance the spark lever to normal driving position. Set throttle lever on steering wheel to a position which will give about 25 miles per hour road speed on a smooth level road. Then adjust the high speed needle to the minimum opening that will give smooth running and maximum engine speed for that throttle opening. This should be a good average adjustment; however, several notches less opening may give best economy for continuous driving or touring and one or two notches more

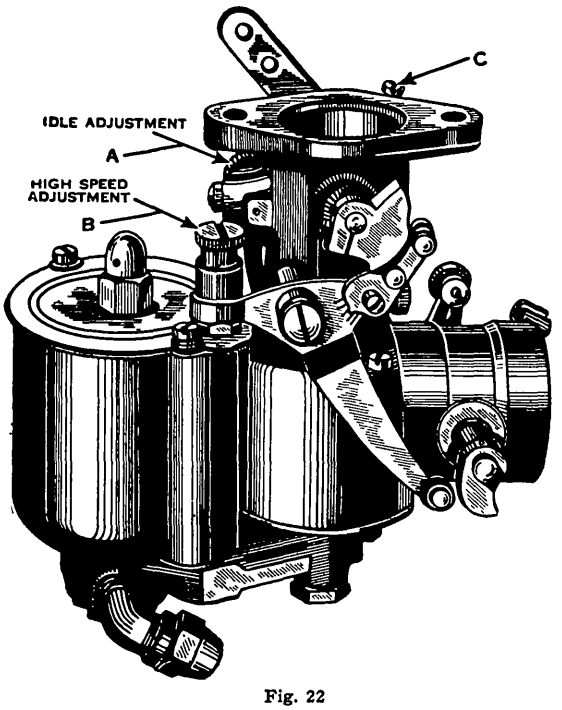


Fig. 22

View of Stromberg Model R carburetor showing the location of the idle adjustment and high speed adjusting screw. The high speed needle on this carburetor is used as an auxiliary control needle for starting and an economizer needle at speeds.

may prove satisfactory for short runs in cold weather when the engine does not get up to normal heat.

If the engine fires unevenly as indicated by irregular exhaust sound at the muffler outlet at part throttle opening, regardless of mixture adjustment, this is probably due to the valves of the engine not seating tightly or their being held open by insufficient tappet clearance. If the engine misses at full open throttle on what otherwise seems to be a proper mixture adjustment, there may be insufficient heat on the intake manifold or the ignition system may be at fault.

Idle Adjustment.—The idling mixture at closed throttle running up to about 8 miles per hour are controlled by the idle adjustment lever Fig. 22. This lever is locked in position by a notched quadrant which has letter "L" (lean) and "R" (rich) stamped at either end. Moving the lever either way will give a leaner or richer mixture as indicated.

The knurled button (A) or idle adjustment screw operates on air so that screwing it in clockwise gives a richer mixture and outward a leaner mixture. To make a correct idle adjustment adjust the throttle so that the engine is running at idling speed. Screw the adjusting screw (A) outward until the motor hesitates or slows down from a lean mixture; then screw the adjusting screw inward until the motor just smooths out.

If after the idle adjustment operation is complete the engine idles too fast readjust the throttle stop screw until the desired idling speed is obtained.

Stromberg Model U

The Model U series carburetors are chiefly characterized by a special form of accelerating pump which gives a more powerful and positive accelerating discharge at low speeds than can be obtained with suction operating wells. The smaller sizes of this series have the single venturi tube and an inclined main discharge jet and are usually fitted with fixed size metering jets. However, adjustable metering jets can be obtained if desired. A gasoline economizer device is also used. As shown in the diagram Fig. 23, the air bleed jet and idling system are similar in action to those of the Model O and T carburetors though slightly different in details of construction.

The lower idle discharge hole is almost entirely below the throttle valve when same is closed. The air bleeder size is taken as constant and the required adjustment of mixture range is obtained by varying the size of the main discharge jet bore.

The carburetor shown in Fig. 23 is a cross section view of a Stromberg Model U carburetor having a mechanically controlled economizer. Fig. 24 is a cross section view of a Stromberg Model U carburetor having a vacuum type economizer.

Three types of high speed fuel regulation are employed: A needle valve is used by a few manufacturers and for resale when the required setting is not definitely known. A high speed metering jet is most generally used having, as illustrated in Fig. 25, a sharp edged thin plate metering orifice formed as a small cup pressed into its tip. These jets are usually used on six cylinder engines and are called "cup type jets." Another form of metering jet used in four cylinder engines and for twin carburetors

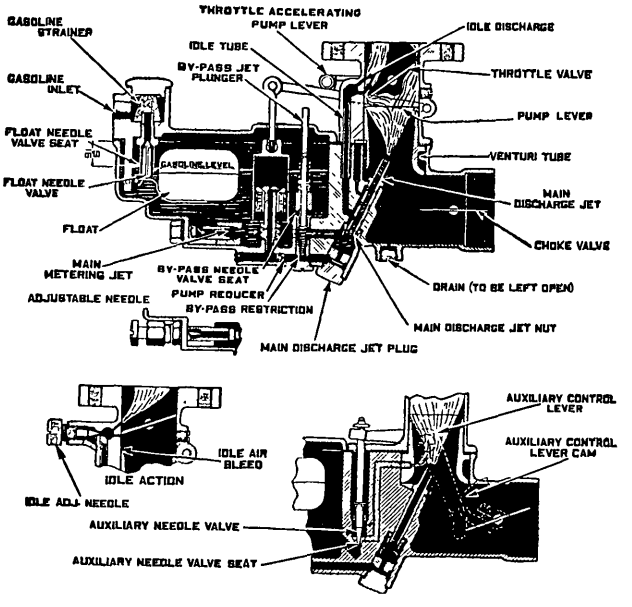


Fig. 23

Cross sectional view of Stromberg Model U carburetor with manual controlled economizer. The carburetor is supplied with a set type main metering jet; however, as shown in the insert this jet may be changed to the adjustable type if necessary.

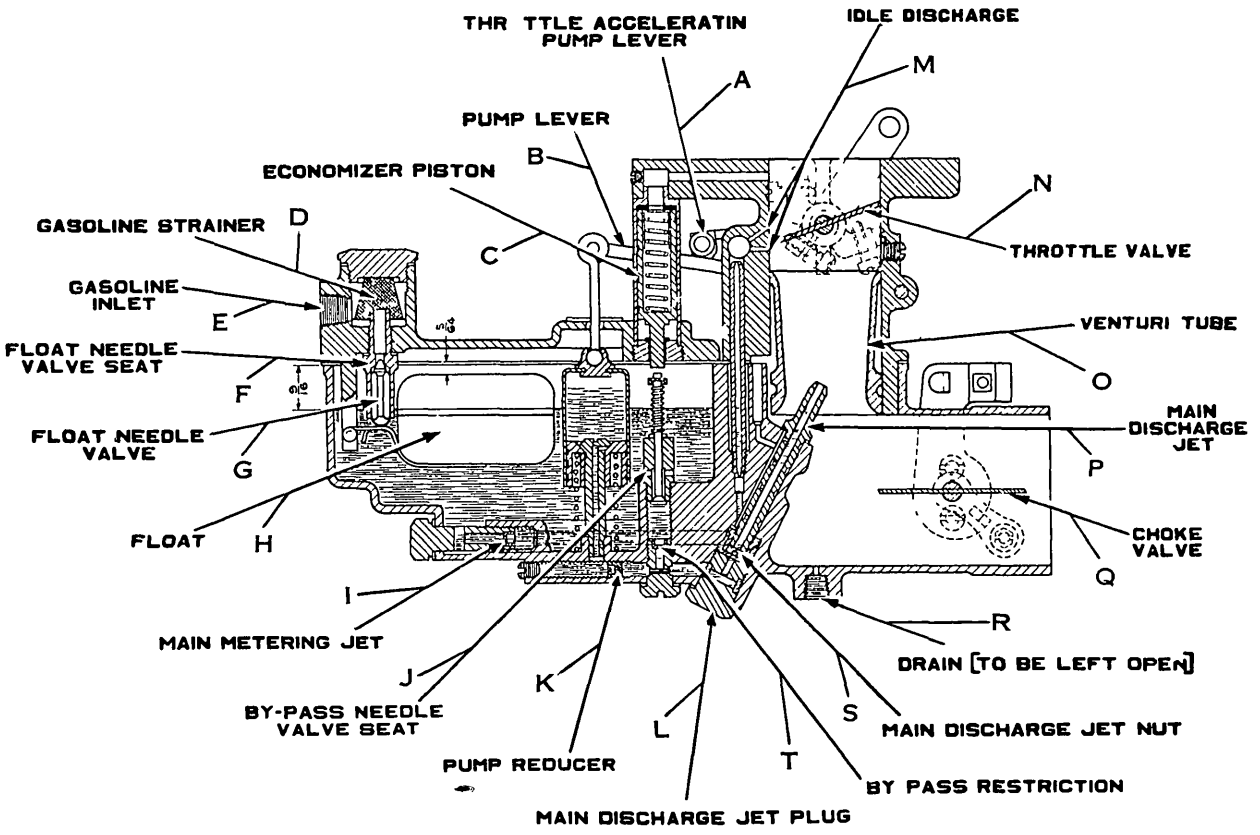
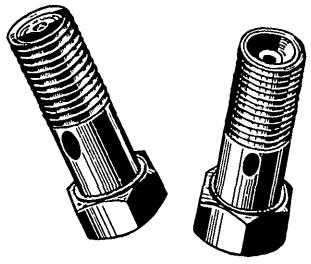


Fig. 24

Cross sectional view of Stromberg Model U carburetor with vacuum economizer. As shown in the section, the main metering jet (I) is of the set type; however, if necessary, this jet may be changed to the adjustable type.

on eight cylinder engines, contains in its end a plug or bushing with a longer metering orifice with bevelled ends and is called a "plug type jet." These jets are marked according to their orifice diameter in thousandths of an inch and are individually tested to make sure that their fuel delivery comes up to a standard. For the same size orifice the plug jet delivers considerably more fuel than the cup jet and has the characteristic of giving a richer mixture in proportion at high suctions so that care should be taken that these two types of jets are not confused.

Fig. 25



Main metering jet used in Stromberg U type carburetors. The jet shown in the left view is known as the plug type and is generally used on four cylinder cars having a twin carburetor. The jet shown in the right view is known as the cup type jet and is generally used on six cylinder motors. These two types of metering jets have different characteristics and must not be confused.

Economizer action in these models is obtained by a submerged gasoline valve operated either mechanically from the pump arm (Fig. 23) or by vacuum (Fig. 24) as the throttle is opened wide. A diagrammatic cross section view of the vacuum type economizer is illustrated in Fig. 26. The fuel delivery or amount of economizer action is determined by the economizer restriction or by-pass jet which has a cup form of metering orifice pressed into its tip. In setting these carburetors, the high speed metering jet or needle setting is selected to give most economical smooth running in the part throttle range; if its mixture ration is then found to be too lean at wide open throttle and full load, a by-pass jet is put in of the size necessary to give the added enrichment.

Accelerating Pump.—The accelerating pump fitted in the U type carburetors is a positive acting device and will deliver a definite accelerating charge regardless of the suction existing in the carburetor; it delivers this charge as a momentary spurt of fuel followed by a sustained discharge lasting several seconds. The amount of this charge is automatically reduced as the temperature rises under the hood.

As illustrated in Fig. 27, the accelerating pump consists of a cylinder with its upper end closed which is depressed by a lever as the throttle is opened. Within the cylinder is a piston sliding on a vertical stud; during fixed throttle position the piston is seated against the conical end of the stud

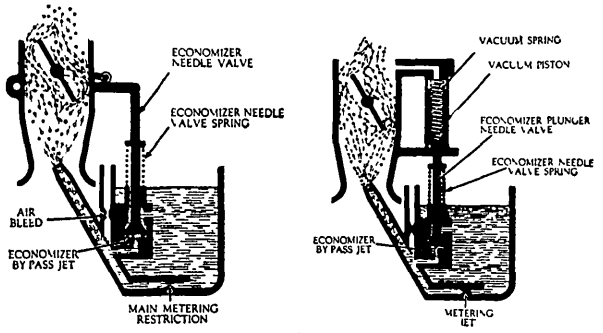


Fig. 26

Diagrammatic view of section of Stromberg carburetor showing the two types of economizer by-pass used. One type as shown in the left view is controlled mechanically by the throttle action, the second and latest type as shown in the right view is controlled by vacuum piston.

thus closing the gasoline passage to the main discharge jet. When the throttle is opened and the pump cylinder depressed, the piston is forced down by the entrapped gasoline and a quick spurt of fuel is delivered through the stud opening to the main discharge jet. As the throttle is held in this position, the piston slowly rises under the force of its spring gradually delivering a further accelerating charge to the main discharge jet. In certain models of these carburetors, the amount of normal accelerating charge is governed by the size of the hole in the head of the stud, while in other models a gasoline reducer plug is threaded into the passage between the stud and the main discharge jet. The size used run between No. 56 and No. 68 wire drill sizes and the delivery of the pump is measured as the number of cubic centimeters of gasoline that will drain into the air horn when the carburetor is set up vertical on a stand under normal fuel head of pressure and the throttle opened ten times in succession. The flow required with different engines and at different seasons varies from 3 c.c. in ten strokes of the pump to 30 c.c. In warm weather

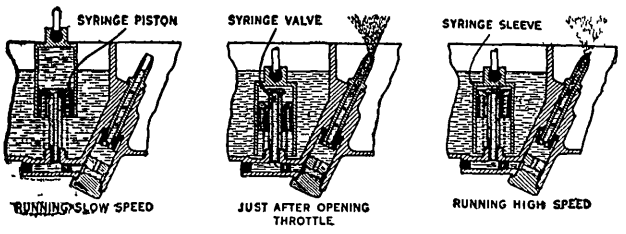


Fig. 27

Cross section view of accelerating pump used on Stromberg carburetors showing three different positions in the operation of this device. In the first view to the left the throttle is closed and the syringe sleeve is relieved while the syringe piston is seated on the stud head. The middle view illustrates the condition just after opening the throttle. The syringe sleeve is depressed all the way while the syringe piston has been forced downward by the entrapped gasoline against the pressure of the spring. The piston is slowly rising forcing gasoline ahead of it out through the pump reducer and main discharge jet. The right view illustrates the condition after acceleration The throttle being held wide open and the syringe sleeve held down. The pump piston has risen to its seat under the force of its spring therefore there is no further acceleration discharge.

when the temperature becomes high under the hood, the temperature of the carburetor also rises and the vapor is liberated from the body of the fuel in the float chamber. The cylinder space of the pump becomes partially filled with this vapor, thereby automatically reducing the accelerating charge.

In determining the proper pump setting, the hole in the top of the stud or the reducer in the pump passage should be increased when necessary to improve the response of the throttle with the engine fairly cool; the action of the carburetor should then be tested with the engine warm and a temperature of 140° F. or more under the hood, to make sure that the response of the engine does not become sluggish from too much gasoline when the throttle is opened from the idling position.

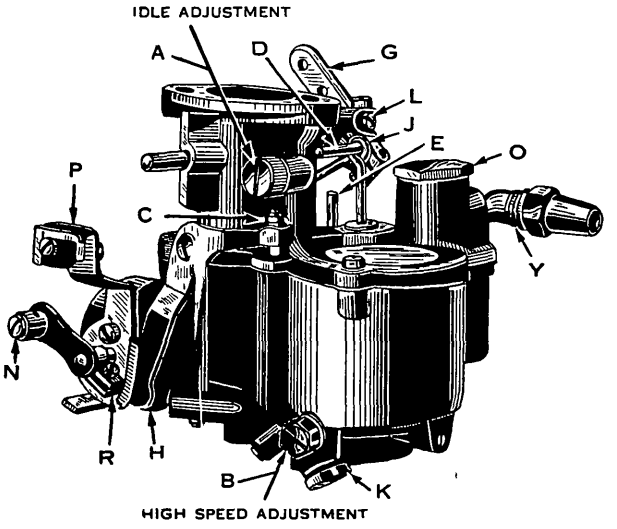


Fig. 28

View of Stromberg Model U carburetor showing the location of the idle adjustment and high speed adjustment (B). This high speed adjustment may be either of the set type or adjustable screw type. The economizer by-pass shown at (E) is operated by the accelerating pump lever (D) which is forced down as the throttle is opened. At high speeds, the lever (D) comes in contact with the economizer rod (E) forcing the rod down and opening the by-pass valve which admits more fuel to the main discharge jet at high speeds.

CARBURETOR ADJUSTMENT

Stromberg U

The adjusting information for all models of the Stromberg U series carburetors are practically the same. The carburetor is furnished from the factory with a fixed type main metering jet which controls the carburetor operation at high speeds. However, this jet may be changed for one of the adjustable type.

Low Speed Adjustment.—The carburetor should carry the correct adjustment when delivered from the factory. However, if the adjustment has been tampered with, it may be restored as follows: Have the engine well warmed up so that the intake pipe

above the carburetor is at least warm to the hand, then slow engine down by gradual motion of the throttle lever on the steering wheel until minimum steady idling speed is reached. Turn the low speed adjustment screw (A) Fig. 28 gradually to the right or the left until steadiest running and fastest running for that throttle position is obtained. This adjustment operates on air so that screwing it in gives a richer mixture and out a leaner mixture. If after this adjustment is made the engine idles too fast, turn the small throttle stop screw either to the right or left until the desired idling engine speed is obtained.

Intermediate Speed.—The mixture at intermediate speed is controlled by the size of the main metering orifice (B) Fig. 28. The size of this metering orifice is stamped on the outer face of the jet in decimal parts of an inch. This metering orifice has been calibrated at the factory to supply the proper amount of fuel and should not be changed without special instructions. (See Carburetor Specification Diagnosis information.)

With wide open throttle an additional quantity of fuel is supplied by the by-pass metering jet.

Accelerating Pump.—The quantity of fuel delivered by the accelerating pump is controlled by the pump discharge jet, the size of which is stamped on the outer face in drill size numbers. The drill size of the pump discharge jet is properly determined at the factory for normal operating condition. For more complete information, see Carburetor Diagnosis information under the heading Accelerating Pump.

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model U.—The following information is given to enable the mechanic to properly diagnose a condition where jet sizes have been changed by drilling or soldering up holes or where jets have been replaced and adjustments changed. Occasionally carburetor specifications will be changed by drilling out jet openings. This should never be done under any consideration. Take for example, idling jets or the air bleeder. In many cases, these openings are made in the carburetor body and drilling out these openings will necessitate installing a new carburetor body in order to obtain the original jet size.

When trouble is experienced with the carburetor, it should be remembered that there are seven places at which the internal adjustments may be changed to affect its operation. When attempting to determine these changes, the work should be done in order as given below.

Idling Discharge Jet (Stromberg Model U).—The idling discharge openings are made in the carburetor body and should not be drilled out under any consideration. Jobs with idling jets too small will rarely, if ever, be encountered but occasionally a job will be encountered where someone unfamiliar with the seriousness of tampering with the idling jets has drilled out the openings. In these cases, it will generally be found necessary to replace the carburetor body in order to restore the original correct opening sizes.

Diagnosis, Idle Jets too Large.—If the idling jets are too large, the motor will Roll and load regardless of how much air is admitted through the idle adjustment. Also, the motor will have a tendency to idle fast with throttle completely closed.

Main Metering Jet (Stromberg Model U).—The main metering jet or high speed adjustment (I) Fig 24, controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of the fixed size or adjustable type.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the metering jet is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Generally, when the main metering jet is too large, the car owner will complain of poor gasoline mileage at all speeds with a tendency in some cases for the motor to run rich on level road. It may also be found that when starting a cold motor the choke can be released immediately. In localities where a hill suitable for testing is not available, the trouble can generally be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the motor will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on the first test) and test the car again with wide open throttle in second gear. If reducing the metering jet size corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor accompanied in most cases with a loss of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerate gradually to about one-fourth throttle.

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of wrong specifications. If after changing the metering jet to a larger or smaller size the trouble still exists or is exaggerated, the by-pass jet should next be checked.

By-Pass Jet (Stromberg Model U).—The by-pass jet is shown as the by-pass restriction (T) Fig. 24. The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely, the by-pass jet may be too large; the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large.—If the by-pass jet (T) Fig. 24 is too large, the car owner will probably

complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available that is steep enough for a test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle conditions. When reducing the size of the by-pass jet, following instructions are recommended: If the by-pass jet in the carburetor is over .040", try five sizes smaller. However, if the by-pass jet in the carburetor is less than .040" try two sizes smaller on first test.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult. To correct this condition, replace with new by-pass valve.

Diagnosis, By-Pass Jet too Small.—If the by-pass jet is too small, the car owner may complain of lack of power at speeds and on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up. A tendency to poor acceleration will prevail under all conditions.

If the trouble symptoms indicate a small by-pass jet try a jet one or two sizes larger.

Main Discharge Jet (Stromberg Model U).—It is seldom in actual practice that a large main discharge jet (P) Fig. 24 will have any effect on carburetor performance other than to lower the gasoline mileage. This condition holds true, however, within certain limits. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. Care should be exercised not to confuse the symptoms caused by a large main discharge jet with those produced by a large by-pass jet. If the trouble is actually caused by a large main discharge jet, reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and Roll at high speeds, the trouble will probably be caused by a main discharge jet that is too large. Care should also be exercised not to confuse the trouble caused by a large main discharge jet with a venturi that is too small. (See information below for small venturi.)

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet (P) Fig. 24 is too small, the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull.

(See paragraph above.)

High Speed Air Bleeder (Stromberg Model U).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore any changes of the air bleed should be avoided.

Diagnosis, High Speed Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on. The car owner may complain of a tendency for the motor to hesitate on slow acceleration and in some cases the motor may die in traffic.

It should be remembered that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, turn to specification table which contains the correct drill size specifications for the particular carburetor model in question. These carburetor specifications will be found in the table at the end of each specification diagnosis section for the particular carburetor model in question. After the correct air bleed wire drill size is known, see whether someone unfamiliar with the correct carburetor calibration procedure has drilled out the air bleed opening. If the air bleed opening has been drilled out, it may be necessary in order to correct the trouble to replace the carburetor body. However, if the air bleeder is of the changeable type, a smaller air bleeder may be used.

In most cases an air bleeder that is too large can be checked out on level road test by slowly accelerating the car to approximately 25 miles per hour with the spark half retarded. If the air bleed opening is too large, from one to three flat spots will probably be experienced and in some cases accompanied by a popping back of the motor during the period of slow acceleration.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds. The car owner may complain of low gasoline mileage at all car speeds accompanied by a tendency in extreme cases for the motor to Roll and load at low speeds and on acceleration. On a level road test with wide open throttle, the car will lack speed and power.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass jet that is too large.

If a hill suitable for test purposes is not available the trouble can generally be checked out by level road test in the following way:

First replace the air bleeder with a larger size (not to exceed four sizes larger on the first test). It should be remembered, however, that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passageway is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved when a larger opening is used but if no change is noticed or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Accelerating Pump (Stromberg Model U).—The pump reducer (K) Fig. 24 regulates the flow of gasoline from the accelerating pump and affects the operation of the carburetor during quick acceleration. On Model U carburetors with manual controlled by-pass or economizer valve make sure that the roller of the throttle accelerating pump lever is in contact with the pump lever arm when the throttle is in closed position.

Diagnosis, Pump Discharge Jet too Large or too Small.—If the pump discharge jet is too large the motor will stumble on quick acceleration. If the jet is too small, the motor will usually backfire on quick acceleration. The trouble may be corrected by either increasing or reducing the size of the discharge jet as indicated by the symptoms of the trouble.

Venturi Tubes (Stromberg Model U).—Two types of venturi tube design are used in Stromberg Model U carburetors. In one type the venturi is cast in the carburetor throttle body and in the other type the venturi is a separate unit that can be changed. In practice it is seldom that trouble from a venturi tube of wrong size is experienced. On the interchangeable type, the venturi is locked into place by a set screw that may work loose. Before testing for wrong venturi size, see that the set screw is tight.

Diagnosis, Venturi too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speeds the carburetor operation may be fairly satisfactory with good gasoline mileage.

Diagnosis, Venturi too Small.—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with throttle wide open, the car will lack speed and gasoline mileage will be poor.

Stromberg Model UU

The Model UU series of Stromberg carburetors have the same float mechanism, venturis, main discharge jets and idle systems as the Model OO type but carries the accelerating pump and economizer of the U series. A needle adjustment is supplied to control the pump action, its setting ranging from one-half turn open in the summer to three turns open in the winter. Plug type metering jets of the Model U series are employed.

CARBURETOR ADJUSTMENT

Stromberg UU

Accelerating Pump Adjustment.—The accelerating pump adjustment is the lower vertical needle (F) Fig. 29. Have the engine warmed up to normal operating temperature for the existing weather and make sure that the choke button on the dash is all the way in. Retard the spark and try opening the throttle suddenly from idle with different needle settings. Too small opening of the adjustment may give a hesitation just as the throttle is opened while too much may give a stumble as the engine picks up speed. An adjustment between these two extremes should be selected.

Idle Adjustment.—The idle adjustment should be made with the engine at normal operating temperature and the spark half retarded. Screw the inner idle adjusting needle (A) Fig. 29 (the one towards the engine) all the way into its seat. This cuts off the gasoline to the four cylinders which are fed by the inner carburetor barrel and will cause the engine to slow down considerably. Adjust the outer idle adjustment needle so that its four cylinders fire smoothly. Leave needle in this position; open or unscrew the inner idle adjustment until all eight cylinders begin to fire and find the position of this adjustment for smoothest idling. It may be necessary to check again the outer idling adjustment cutting it down slightly. Both idle adjustments should preferably be made slightly on the rich side.

If after this adjustment is made the engine idles too fast, adjust to the desired idling speed by means of the throttle stop screw (L).

CARBURETOR SPECIFICATION DIAGNOSIS

Stromberg Model UU.—In each barrel of the carburetor will be found two idling openings; one is located below the throttle valve and the other is

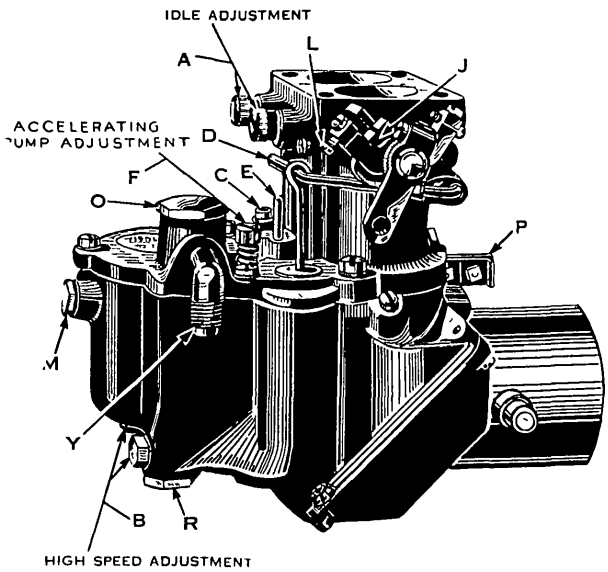


Fig. 29

View of Stromberg Model U carburetor showing the location of the idle adjusting screw (A) and accelerating pump adjusting screw (F) The main metering jet or high speed adjustment for Model U Twin carburetors may either be set or of the adjustable type.

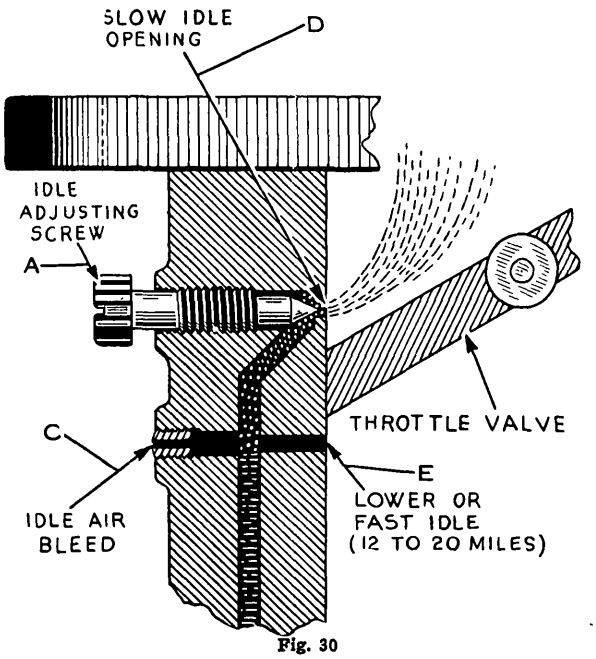


Fig. 30

Diagrammatic view showing idling system for Stromberg Model UU Twin carburetor. The idling adjusting screw (A) controls the fuel mixture which passes through the upper idling opening with the throttle fully closed. Air is supplied to the idle tube by means of a separate idle air bleed as shown at (C). As soon as the throttle is cracked, the air and gasoline mixture is drawn through the lower idling hole (E). The fuel supplied to the motor from the idling opening affects the motor operation at speeds from 10 to 18 miles per hour.

located above the throttle valve as shown at (D) and (E) Fig. 30. The opening below the throttle valve is a set opening and the gasoline and air mixture that passes through this opening is regulated by an air bleed hole (C) which is located just below the idling adjustment knurled nut (A).

The idle discharge opening in each barrel located above the throttle is also a fixed opening but is controlled by means of the idling adjusting screw (A) Fig. 30. The idling adjusting screw is not an air bleed control but actually controls the amount of fuel that passes through the upper idling opening.

As described above, the knurled idling screw takes care of the motor at slow idling speed with the throttle closed. The idle opening below the throttle takes care of the motor from 10 to 18 miles per hour as soon as the throttle valve is open.

Idle Discharge Jets (Stromberg UU).—While the idle air bleed below the adjusting screw is of a fixed size, it will be found that in some cases persons unfamiliar with this type of carburetor have either soldered this hole up and drilled it out smaller or drilled the original hole larger.

Diagnosis, Idle Air Bleeder too Large.—If the idle air bleed hole below the adjusting screw is too large, the mixture will be leaned out for speeds from approximately 10 to 18 miles per hour. The effect of a lean mixture on motor performance will be noticed in proportion to the amount that the idle air bleeder has been drilled out and a condition may be reached whereby the motor will hesitate with a tendency to stumble and in some cases may sputter on slow acceleration from 10 to 18 miles per hour.

To determine whether or not the idle air bleeder is too large, adjust the low idle screw to a point where the motor idles properly at slow speeds, with the throttle valve completely closed. Crack the throttle to a point where the motor will run at approximately 15 miles per hour. In cracking the throttle, advance the throttle lever very slowly on the quadrant so that the motor will accelerate slowly up to approximately 15 miles per hour. If the idle air bleed is too large, the motor will have a decided flat spot and if the throttle is left at a point where the motor runs at approximately 15 miles per hour, the motor will stumble and run rough. Continuing with the check, leave the throttle in this position with the motor running as described and open the idle adjusting screw. As the idle adjusting screw is opened, if the idle air bleed is too large, the motor performance smould smooth out and the motor run smoothly.

Diagnosis, Idle Air Bleed too Small.—If the idle air bleeder is too small, the motor will have a tendency to Roll and load at from 10 to 18 miles per hour.

To test for this condition, adjust the motor to the correct idle with the throttle completely closed; then crack the throttle very slowly with the spark lever half retarded to a point where the motor will run at approximately 15 miles per hour. If the idle air bleed hole is too small, the motor will have a tendency to Roll and run rich. If the motor has a tendency to Roll and run rich, screw the idle adjusting screw in leaning up the mixture that is supplied to the carburetor barrels from the top idle hole above the throttle. This procedure should have a tendency to smooth the motor out and cause it to run properly.

If the idle bleed hole is found to be too small, correct by using a larger bleed hole.

Main Metering Jet (Stromberg Model UU).—Two main metering jets are used on Stromberg Model UU series carburetors. The main metering jet or high speed adjustment controls the flow of gasoline for speeds above 20 miles per hour. This jet may be either of a fixed size or adjustable type. When testing to determine whether or not the main metering jets are of the wrong size, if a change is made in one jet the same change should be made in the other jet.

Diagnosis, Metering Jet too Large.—To determine whether the metering jet is too large the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the metering jet is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Generally, when the main metering jet is too large, the car owner will complain of poor gasoline mileage at all speeds with a tendency in some cases for the motor to run rich on level road. It may also be found that when starting a cold motor the choke can be released immediately. In localities where a hill suitable for testing is not available, the trouble can generally be checked out on a level road test by accelerating the car with wide open throttle in second gear. If the metering jet is too large, the motor will probably have a tendency to stumble during the period of fast acceleration. If this is found to be the case, change the metering jet to a smaller size (approximately two sizes on first test) and test the car again with wide open throttle in second gear. If reducing the metering jet size corrects the trouble, the car performance will be smooth through the full range of fast acceleration. However, if the cause of the trouble is not due to a main metering jet that is too large, then reducing the size of the jet will probably cause the motor to sputter in the carburetor accompanied in most cases with a loss of power and speed.

Diagnosis, Metering Jet too Small.—If the main metering jet is too small, the car will have a tendency to stall on a light grade when the motor is throttled down to approximately 7 or 8 miles per hour and then accelerated gradually to about one-fourth throttle.

The symptoms produced by a metering jet of the wrong size may be confused with a by-pass or main discharge jet of the wrong specifications. If after changing the metering jet to a larger or smaller size the trouble still exists or is exaggerated, the by-pass jet should next be checked.

By-Pass Jet (Stromberg Model UU).—The by-pass jet is shown as the by-pass restriction (T) Fig. 24. The purpose of this jet is to supply an increased amount of gasoline to the main discharge jet at speeds above 40 to 45 miles per hour or any condition that requires a wide open throttle.

Three conditions of trouble may be encountered in connection with the by-pass jet. Namely, the by-pass jet may be too large; the by-pass or economizer valve may stick or not seat properly due to wear or warp or the by-pass jet may be too small.

Diagnosis, By-Pass Jet too Large.—If the by-pass jet (T) Fig. 24 is too large, the car owner will probbably complain of low gasoline mileage at car speeds above 40 miles per hour. To check for this condition, the car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the by-pass is too large, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

If no hill is available that is steep enough for a test, the car can be tried out under level road conditions by first substituting a smaller by-pass jet and then trying the car out under level road conditions to see that it does not have a tendency to load under wide open throttle conditions. When reducing the size of the by-pass jet, following instructions are recommended: If the by-pass jet in the carburetor is over .040", try five sizes smaller. However, if the by-pass jet in the carburetor is less than .040" try two sizes smaller on first test.

Diagnosis, By-Pass Valve Sticking.—The by-pass valve may stick or not seat properly due to wear or warp. If this condition exists, the carburetor may be affected at moderate speeds (20 to 35 miles per hour) resulting in low gasoline mileage. This trouble may also make a correct carburetor adjustment difficult. To correct this condition, replace with new by-pass valve.

Diagnosis, By-Pass Jet too Small.—If the by-pass jet is too small, the car owner may complain of lack of power at speeds and on heavy pulls accompanied in some instances by a condition of motor hesitation similar to cutting out of the ignition.

To check, try the car out on a hill steep enough to require a full open throttle. Depending upon the individual characteristics of the car, a by-pass jet that is too small may show up in lack of speed and power with an occasional sputtering or cutting out of the motor or a condition may exist where when the throttle is fully open, the car will have a decided flat spot but as the throttle is partially closed, the motor will pick up. A tendency to poor acceleration will prevail under all conditions.

If the trouble symptoms indicate a small by-pass jet try a jet one or two sizes larger.

Main Discharge Jets (Stromberg Model UU).—There are two main discharge jets used on Stromberg Model UU series carburetors. It is seldom in actual practice that a large main discharge jet (P) Fig. 24 will have any effect on carburetor performance other than to lower the gasoline mileage. This condition holds true, however, within certain limits. By that we mean that a main discharge jet may be so large that it will throw the carburetor out of balance. Care should be exercised not to confuse the symptoms caused by a large main discharge jet with those produced by a large by-pass jet. If the trouble is actually caused by a large main discharge jet, reducing the size of the by-pass jet may correct the loading on a pull but if the motor continues to load and Roll at high speeds, the trouble will probably be caused by a main discharge jet that is too large. Care should also be exercised not to confuse the trouble caused by a large main discharge jet with a venturi that is too small. (See information below for small venturi.)

Diagnosis, Main Discharge Jet too Small.—If the main discharge jet (P) Fig. 24 is too small, the gasoline mileage may be good but the car will be slow on acceleration and lack speed and power especially on a hard pull (see paragraph above).

High Speed Air Bleeder (Stromberg Model UU).—The high speed air bleed and main discharge jet have been calibrated at the factory to work in perfect balance; therefore any changes of the air bleed should be avoided. In the back of the book will be found more complete information explaining the purpose of the high speed air bleeder.

Diagnosis, Air Bleeder too Large.—If the air bleeder is too large, the trouble may be indicated by a sputtering of the motor on fast acceleration or a hesitation on slow acceleration. Sometimes at extreme high speeds a gentle popping in the muffler will be produced similar to the exhaust noise produced when coasting down a hill at a high rate of speed with the throttle closed and the ignition switch turned on. The car owner may complain of a tendency for the motor to hesitate on slow acceleration and in some cases the motor may die in traffic.

It should be remembered that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, turn to the specification table which contains the correct drill size specifications for the particular carburetor model in question. These carburetor specifications will be found in the table at the end of each specification diagnosis section for the particular carburetor model in question. After the correct air bleed wire drill size is known, see whether someone unfamiliar with the correct carburetor calibration procedure has drilled out the air bleed opening. If the air bleed opening has been drilled out, it may be necessary in order to correct the trouble, to replace the carburetor body. However, if the air bleeder is of the changeable type, a smaller air bleeder may be used.

In most cases an air bleeder that is too large can be checked out on level road test by slowly accelerating the car to approximately 25 miles per hour with the spark half retarded. If the air bleed opening is too large, from one to three flat spots will probably be experienced and in some cases accompanied by popping back of the motor during the period of slow acceleration.

Diagnosis, High Speed Air Bleeder too Small.—If the high speed air bleeder is too small, the car performance on level road test will be similar to a condition of late ignition timing or retarded spark. The motor will be logy on acceleration and at road speeds.

The car owner may complain of low gasoline mileage at all car speeds accompanied by a tendency in extreme cases for the motor to Roll and load at low speeds and on acceleration. On a level road test with wide open throttle, the car will lack speed and power.

In most cases the trouble can be checked out by the same test procedure used for a large metering jet. The car should be tried out on a hill steep enough that with wide open throttle a car speed not to exceed 10 miles per hour in high gear can be maintained. If the high speed air bleeder is too small, a tendency to Roll and load will be noticed just as the load on the motor is lightened by the car passing over the brow of the hill with the throttle still fully open.

Care should be exercised not to confuse a condition caused by an air bleeder that is too small with a main metering jet or by-pass jet that is too large.

If a hill suitable for test purposes is not available the trouble can generally be checked out by level road test in the following way.

First replace the air bleeder with a larger size (not to exceed four sizes larger on the first test). It should be remembered, however, that on some Stromberg models the high speed air bleeder is drilled in the body of the carburetor while on other models the air bleeder is a changeable part. If the carburetor giving the trouble has the air bleeder drilled in the body, do not tamper with it other than to see that the passageway is clean. However, if the air bleeder is of the changeable type, someone unfamiliar with the correct carburetor calibration procedure may have reduced the size.

Next take the car out on a level stretch of road and accelerate slowly up to approximately 30 miles per hour. If the air bleeder was too small, motor performance should be improved when a larger opening is used but if no change is noticed or if the trouble is exaggerated, check for a main metering jet or by-pass jet that is too large.

Accelerating Pump (Stromberg Model UU).—The pump discharge on the UU Stromberg carburetors is adjustable by means of an adjusting screw or needle valve shown as the lower vertical needle (F) Fig. 29. This is slightly different than models of the U carburetor in that the flow of gasoline from the accelerating pump in the single barrel jobs is usually controlled by a reducer or restriction in the pump passage. To adjust the accelerating pump discharge for the Model UU carburetor, have the engine warmed up to normal operating temperature for the existing weather and make sure that the choke button on the dash is all the way down. Retard the spark and try opening the throttle suddenly from idle with different accelerating pump adjustment needle settings. Too small an opening of the adjustment may cause a hesitation just as the throttle is opened; or too wide an adjustment may give a stumble as the engine picks up speed. An adjustment between these two extremes should be selected.

Venturi Tubes (Stromberg Model UU).—The Stromberg Model UU series carburetors is equipped with two venturi tubes locked into position by means of a set screw and lock nut. In practice, it is seldom that trouble from a venturi of the wrong size is experienced. However, this condition may arise in cases where someone unfamiliar with Stromberg carburetor has installed the wrong size venturi tube. Before making any test for the wrong venturi size, see that the set screws which hold the venturi tubes in position are tight. Never make a change of the venturi tubes in one barrel of the carburetor without changing the tubes in the other barrel.

Diagnosis, Venturi Tubes too Large.—If the venturi size is too large, motor acceleration may be smooth but slow similar to a condition that would be caused by a small main discharge jet. As the car gains momentum on acceleration, the motor performance will improve until at high speeds, the carburetor operation may be thoroughly satisfactory with good gasoline mileage.

Diagnosis, Venturi Tubes too Small.—If the venturi is too small, the motor will have good power on acceleration at wide open throttle under 20 miles per hour but as the car picks up momentum and the load is lightened with the throttle still wide open, the motor will have a tendency to Roll and load. On a level stretch of road with throttle wide open the car will lack speed and gasoline mileage will be poor.